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POSITIVE AND NEGATIVE SOCIAL INFLUENCES ON PHYSICAL ACTIVITY IN OLDER ADULTS

BY

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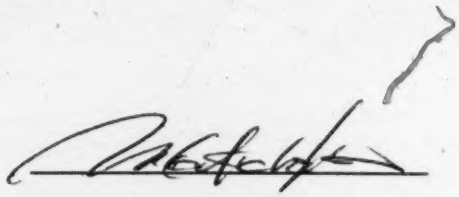

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Abstract

The purpose of this dissertation was to investigate positive and negative social influences on the physical activity of older adults. Three studies were conducted in the overall investigation.

In the first study, existing research findings concerning social influences on physical activity were reviewed and consolidated. Special attention was given to clarifying the conceptual and measurement issues pertaining to social influence constructs in the related studies. Although considerable consensus existed regarding the importance of social influences for physical activity, less consensus existed regarding the method of measuring or assessing these social influences. The review suggested that future studies should scrutinize both positive and negative social influences through a careful conceptualization of the various types of positive and negative social influences specific to physical activity of the older adult population.

The second study involved the development of a multidimensional measure designed to assess positive and negative social influences on the physical activity of older adults. Hypothesized two-order factor models, based on the independence between positive and negative social influences, were tested through a series of confirmatory factor analyses, using 479 survey responses that were collected at 51 senior groups in Edmonton. A hypothesized conceptual model was confirmed supporting the distinctiveness between positive and negative social influences and the subdimensionality of these two constructs.

In the last study, the measure developed in the second study was used to examine the relative impact of positive and negative social influences on older adult physical activity. The main analysis focused on how the relative impact changed according to three

different sources of influence: family members, friends and health professionals. The findings indicated that although negative influences rarely occurred compared with positive ones, the negative influences had an equal or even stronger impact on the current physical activity levels. Moreover, when the negative influences were given by health professionals, the detrimental effects of negative social influences on physical activity exceeded the beneficial effects of positive influences. These findings suggested that there is need for a redirection toward more balanced assessment and intervention strategies which take into account both the positive and negative properties of social influences for promoting physical activity in older adults.

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Chapter 1
Introduction

Health professionals are increasingly interested in health promotion aimed at older adults, with particular emphasis on the potential benefits of physical activity. Ample research evidence has suggested that regular physical activity reduces the risk of several potentially life-threatening physical conditions among aging adults, including coronary heart disease, hypertension, diabetes, metabolic disorders, osteoporosis/osteoarthritis, and colon cancer (Elward & Larson, 1992; Lee, 1994; McCarter, 1996; U.S. Surgeon General's Report, 1996). Some researchers have reported that physical activities also improve physiological functioning in older age. For example, Hopkins, Murrah, Hoeger and Rhodes (1990) found that functional capacity, measured by maximum oxygen uptake, was improved by 25% after a 6-month low-intensity program for seniors. Other studies showed improvements in the measures of body composition (Kohrt & Holloszy, 1992), flexibility (Stacey, Kozma, & Stones, 1985), and muscular strength and endurance (Brown & Holloszy, 1991) among older adults. Furthermore, research evidence is starting to build regarding the social and psychological benefits of physical activities (McAuley & Rudolph, 1995; McPherson, 1994): physical activity decreases depression, anxiety and stress, and increases cognitive function, self-confidence, and life satisfaction among older adults (Dustman, Emmerson, & Shearer, 1994; O'Connor, Aenchbacher, & Dishman, 1993).

Large-scale survey studies commonly show, however, that a sizable percentage of the aging adult population is mostly physically inactive (Stephens & Casperson, 1994; Stephens & Craig, 1990). Canadian Fitness and Lifestyle Research (1996) reported that

52% of the men and 62% of the women over the age of 65 were not participating in regular physical activity (i.e., for at least 30 minutes every other day) at a moderate or greater level of intensity (i.e., 50% or greater of age-specific capacity), which is thought to be necessary for gaining health benefits. Because the large aging adult population is likely to encounter unnecessary health problems caused by its sedentary lifestyle, it is urgent to identify effective and efficient intervention programs appropriate for this vast target population.

An approach to the widespread behavior change of the aging population that has long captured the attention of social psychologists is the use of social influence (Edwards, 1990). Broadly defined, social influence involves both direct and indirect ways in which people can affect each other (Fisher & Misovich, 1990). Physical activity scientists have also advocated the importance of the development of effective intervention strategies that integrate social influence constructs at the group, community, and societal levels (Carron, Hausenblas & Mack, 1996; Courneya & McAuley, 1995; King, 1994). These interventions are expected to have a number of potential strengths. For example, interventions utilizing social relationships have a great potential to: 1) reach persons in the natural, daily settings in which they live; 2) reach a larger, more diverse number of persons in the community; 3) deliver a health message in a repeated fashion through a variety of communication channels and settings, leading potentially to the augmentation and reinforcement of the message, which in turn may result in a greater impact (King, 1991). Thus, interventions arising from and affecting the social relationships in which people are enveloped are able to reach people who historically have been unserved and under-served (e.g., sedentary

older adults).

The most frequently cited intervention using social influence constructs in health promotion sciences is social support (O'Brien Cousins, 1994). Numerous studies have demonstrated that various formal and informal helping actions that occur in social relationships have a strong positive impact on the physical and psychological well-being of older adults (e.g., Kaplan & Toshima, 1990; Sarason, Pierce and Sarason, 1990). Various types of social support are especially important for older adults for several reasons. First, older adults experience many life events and role transitions (e.g., retirement, bereavement, and residential relocation) that lead to network disruptions and reconfigurations. Second, the physical limitations that some older adults experience tend to restrict their social network involvement and therefore they require some assistance in meeting the needs of independent living. Third, basic aging processes may produce shifts in their motivations for social contact and in their preferences for social partners, resulting in a realignment of their social network ties (Carsttensen, 1991). Although social support is a meaningful social construct in communities, relatively little is known about the various qualities of social support interaction in extended social relationships of older adults in community settings. In physical activity studies, the structural variables of social relationships have been used more often than the quality or content of social relationships. For example, existing measurement of social support in the community population studies has assessed the number of support sources (e.g., family support and friend support) rather than their behavioral or functional aspects (specific supportive actions). These source-reliant perspectives alone cannot provide us with the practical information on how

older adults could be supported to be more active. Based on the consensus that social support is a "rich" idea (Vaux, 1992), future studies should take the next step of exploring various supportive actions unfolding in social relationships.

While most contemporary work has been dominated by a nearly unwavering enthusiasm for the construct of social support, several researchers have been recently making the shift from a preoccupation with social influence as a solely supportive content to a consideration of the dual nature of social relationships. For example, Rook (1992) has noted that this one-sided perspective fails to take into account the proposition advanced by exchange theorists that social relationships entail benefits and costs, and act as a "double-edged sword" (Burg & Seeman, 1994). Thus, social relationships have two different functions: positive and negative social influences (Okun, Melichar & Hill, 1990; Rook, 1994). In the physical activity sciences, there has been an implicit assumption that social positiveness and negativity are the opposite ends of a continuum, and that the presence of positive social influences is synonymous with the absence of negative social influences (and *vice versa*). However, several investigators (e.g., Krause, 1995; Rook, 1992) have demonstrated that negative social influence is a distinct concept, unrelated to positive social influence. There is a clear need for closer inspection which would test whether these positive and negative social influence properties are independent or interdependent in the context of physical activity. For example, if positive and negative social influence are demonstrated as independent constructs, they should be measured separately, and intervention strategies should be designed in a parallel manner to include both positive and negative social influences. Therefore, research that simultaneously

scrutinizes the positive and negative properties of social relationships may provide new perspectives for assessment and intervention strategies in promoting physical activity.

Based on a parallel investigation of positive and negative social influences, two major goals are pursued in this dissertation. The first goal is to develop a new measure for assessing both positive and negative social influences on physical activity among older adults. The second goal is, using the proposed measure, to understand how positive and negative social influences are associated with the involvement of physical activity in older adults. In order to achieve these goals, the following three studies were undertaken.

In the first, existing research findings concerning social influences on physical activity were reviewed and consolidated. Sound conceptualization must precede the development of assessment tools. Therefore, the first step in this study involved grappling with the conceptual issues of social influences in the physical activity sciences. Special attention was given to reviewing the operational definitions employed in social influence measurement in related studies, and desirable measurement approaches were also proposed.

The second study was devoted to the development of a multidimensional measure designed to assess social influences on the physical activity of older adults. This first stage of scale development focused on presenting the information on content validation processes. Next, the internal structure and the psychometric properties of the proposed measure were analyzed using data from 479 older adults which was collected by means of a questionnaire survey. On the basis of multidimensional conceptual frameworks in current gerontological studies, two questions were examined: 1) are positive and negative

social influences opposite ends of a continuum, or are they independent domains in the context of physical activity of older adults? and 2) if the independency is assumed, are these positive and negative social influences further divided into some distinct subdimensions?

In the third study, the relative impact of positive and negative social influences on older adult physical activity was examined using the sample from the second study. This study extended the analytical scope from a simple comparison between the positive and negative influences to the clarification of how the relative impact changed when different social actors provide these influences. More specifically, this stage of the analysis compared the beneficial effects of positive influences and the detrimental effects of negative influences on physical activity. In addition, it examined how the relative impact changed according to three different sources of influences: family members, friends, and health professionals.

The final chapter in this dissertation summarized the main findings and discussed implications for assessment and intervention strategies. This chapter concluded with a number of suggestions for future research which were likely to contribute to our understanding of how social influences promote physical activity in older adults. These included a more thorough examination of the some of the findings presented in the previous three papers, as well as a suggestion for theoretical frameworks which might be used successfully to expand our research scope on social influences in physical activity.

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Chapter 2
Social Influences on Physical Activity in Older Adults: A Review[1]

A growing body of research evidence supports the hypothesis that regular physical activity reduces the risk of several life-threatening conditions among older adults, including coronary heart disease, hypertension, diabetes, metabolic disorders, osteoporosis, osteoarthritis, and cancer (Elward & Larson, 1992; Haskell et al., 1992; Kovar et al., 1992; Lee, 1994; McCarter, 1996; U.S. Surgeon General's Report, 1996). Furthermore, research evidence is starting to build regarding the social and psychological benefits of physical activities (McAuley & Rudolph, 1995). For example, physical activity decreases depression, anxiety and stress, and is also associated with improved cognitive function, self-confidence and life satisfaction among older adults (Dustman, Emmerson, & Shearer, 1994; O'Connor, Aenchbacher, & Dishman, 1993).

Despite the many health benefits of physical activity, cross-sectional data generally indicates a decline in participation in physical activity with advancing age (Stephens & Casperson, 1994). For example, Campbell's Survey on the Well-Being of Canadians (1988) reported that 50% of men and 70% of women over the age of 65 were not participating in regular physical activity (i.e., for at least 30 minutes every other day) at a moderate level of intensity (i.e., 50% or greater of age-specific capacity). Because a significant number of preventable health problems are caused by a sedentary lifestyle, it is important to identify effective and efficient intervention programs which can increase the population of older persons engaging in physical activity.

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Most physical activity intervention programs have tended to focus on the need to change personal attributes (e.g., attitudes, intentions, self-efficacy) among individual exercise participants (King, 1994). An alternative to individualized exercise prescription is an approach that attempts to address social factors influencing physical activity at the group and community level (Carron, Hausenblas & Mack, 1996; King, 1991). Social influences are expected to have significant roles in physical activity settings, because research indicates that more than 65% of those who exercise choose to do so in groups rather than alone (Courneya & McAuley, 1995).

The most frequently studied social construct in physical activity and health promotion research is social support. Numerous studies have demonstrated that formal and informal social support has a strong positive impact on physical and psychological well-being. In the physical activity sciences, social support interventions have been recognized as effective intervention strategies, particularly in group exercise settings (Courneya & McAuley, 1995; Duncan & Stoolmiller, 1993). Although social support is a meaningful construct, both inside and outside a group exercise setting, relatively little is known about the various dimensions of social support which exist in extended social networks in community settings. As more research studies are directed at the community-level, it becomes increasingly important to understand the various influences that are activated across the full range of social relationships. Most previous social support research in community settings employs an additive model which assumes that "more amounts of support are better."

Recently, the conceptualization of social influences as an exclusively supportive

construct has been questioned. Several investigators (e.g., Krause, 1995; Rook, 1992) have noted that this one-sided perspective fails to take into account the proposition advanced by exchange theorists, that social influences in social relationships entail benefits and costs and act as a "double-edged sword" (Burg & Seeman, 1994). Thus, social influences can have both positive and negative consequences (Okun, Melichar & Hill, 1990; Rook, 1994). Among the negative social influences that have been identified are such terms as, "social hindrance" (Norris, Stephens & Kinney, 1990; Ruehlman & Wolchik, 1988), "social rejection" (Hirsch & Rapkin, 1986), "social inhibition" (Guerin, 1988), and "social strain"(Rook, 1992). Although these negative social influences may occur less often than positive social influences such as social support, studies have shown that the negative influences are sometimes stronger determinants of health outcomes than the positive ones (Finch et al., 1989; Okun, Melichar & Hill, 1990; Pagel, Erdly & Becker, 1987; Schuster, Kessler & Aseltine, 1990), or are equally important determinants (Bernner, Norvell & Limacher, 1989; Lakey, Tardiff & Drew, 1994).

Little available information exists on the role of negative social influences in physical activity settings. The past decade of research in the physical activity sciences has emphasized the positive influences in social relationships such as social support, almost always to the exclusion of their negative properties. For example, existing social support studies have assumed that the supportive and unsupportive behaviors from others are polar opposites that define one social support domain, only rarely examining both dimensions simultaneously. Several recent studies in health promotion have demonstrated that positive and negative social influences are two relatively independent social

experiences (Rook, 1992; Oostrom et al., 1995). This suggests that research studies which examine both the positive and negative functions of social relationships have the potential to provide new perspectives on community intervention strategies for the promotion of physical activity.

The objectives of this paper are: 1) to consolidate current findings from the interdisciplinary literature concerning social influences on physical activity for aging adults; and 2) to identify major positive and negative social influences which are associated with physical activity among aging adults. In this review, *positive social influences* for physical activity are defined as supportive behaviors and helpful actions of others which encourage physical activity involvement. *Social support* is used interchangeably with positive social influences in this review. On the other hand, *negative social influences* for physical activity refer to unsupportive, inhibitive, and resistive behaviors of others which discourage physical activity involvement. Social support theorists suggest that negative social influences (or unsupportive behaviors) are distinguished from a mere absence of support (Ruehlman & Karoly, 1991).

Positive Social Influences

In the physical activity sciences, social support has been recognized as an important determinant of leisure-time physical activity; social support is related to adherence to exercise classes, intention to be physical activity, self-efficacy for physical activity, and perceived behavioral control in physical activity settings. In Table 2-1, data from 29 studies examining social support for physical activity are summarized.

Information is provided on: 1) description of the subjects; 2) outcome variable(s); 3) support sources (network members); and 4) types of social support. The major findings are summarized for each outcome variable.

Table 2-1. Social Support Research in Physical Activity Sciences

1. Calfas et al., (1996)	
Subjects:	212 sedentary patients over age 18 (34 males and 178 females, mean age= 39)
Outcome Variable:	Change in exercise level during 6 years
Support Sources:	Family, friends, physician
Support Types:	Structured support from physicians: assisting to establish an activity goal and overcome barriers, discussing the benefits of activity, and suggestion of adequate sources of social support ($p<.05$)
2. Clark et al. (1995)	
Subjects:	2713 older adults who enrolled at a health care organization (1058 males and 655 female, mean age =73)
Outcome Variable:	Exercise self-efficacy
Support Sources:	Not specified
Support Types:	1) General emotional support for well-being: the presence of someone to discuss problems and decisions regularly (n.s) 2) General instrumental support for well-being: the presence of someone who could care for the respondent more than occasionally if they were to become ill (n.s.)
3. Courneya & McAuley (1995)	
Subjects:	104 University students, faculty and staff, pregnant women, disabled persons
Outcome Variable	Exercise class attendance, intention and perceived behavioral control during 12 weeks
Support Sources:	Instructor and exercise class attendant
Support Types:	Replication of support measurement of Social Provision Scale (see Duncan et al., 1993) 1) Guidance (PBC, n.s.) 2) reassurance of worth (PBC, $p<.05$) 3) social integration (PBC, n.s.) 4) attachment (PBC, $p<.05$) 5) reliable alliance (PBC, n.s.) 6) opportunity for nurturance (PBC, $p<.05$)
4. Duncan et al. (1993)	
Subject:	85 Exercise class attendants (41 males and 44 females, age range=45 to 64)
Outcome Variable	Exercise class attendance, exercise self-efficacy during 10 weeks

(continued)

Table 2-1 (continued)

Support Sources:	Instructors and exercise class attendants
Support Types	1) guidance: there is someone in my exercise class I could talk to about important decisions in my life (attendance $p<.05$; efficacy, n.s.) 2) reassurance of worth: I have relationships in my exercise class where my competence and skill are recognized (attendance, n.s.; efficacy, $p<.05$) 3) social integration: within my exercise class I feel part of a group of people who share my attitudes and beliefs (attendance, n.s.; efficacy, n.s.) 4) attachment: I have close relationships in my exercise class that provide me with a sense of emotional security and well-being (attendance, $p<.05$; efficacy, n.s.) 5) reliable alliance: there are people in this exercise class that I can depend on to help me if I really need it (attendance, n.s.; efficacy, n.s.) 6) opportunity for nurturance: there are people in this exercise class who depend on me to help them (attendance, $p<.05$; efficacy, n.s.)
5. Eaton et al. (1993)	
Subjects:	1018 community residents (424 males and 657 females, mean age=42.2)
Outcome Variable:	Change in frequency of physical activity
Support Sources:	Children and organization
Support Types:	1)Children's recommendation of exercise ($p<.001$) 2)Organization membership ($p<.01$)
6. Golding & Ungerleider (1991)	
Subjects:	587 masters athletes (468 males and 119 female, age range=30 to 88, mean=50.1)
Outcome Variable	Training frequency
Support Sources:	Spouse, work associates, relatives, and friends
Support Types:	Spouse's emotional (caring) support (n.s.), co-workers' emotional support (n.s.), relatives' emotional support (n.s.), and friends' emotional support ($p<.05$)
7. Gorely & Gordon (1995)	
Subjects:	672 adults (290 males and 292 female, age range=50 to 65)
Outcome Variable	Stage of exercise behavior
Support Sources:	Not specified
Support Types:	Combined index (n.s.) of four types of perceived availability of support: 1) I have someone on whom I can depend when I am having problems with exercising. 2) I have a healthy friend who encourages me to exercise when I don't feel up to it. 3) I have someone who points out my rationalizations for not exercising. 4) I have someone who provides feedback about my exercising.
8. Hibbard (1988)	
Subjects:	1140 members of a health maintenance organization (521 males and 619 females, >50 years old)
Outcome Variable:	Physical exertion level among leisure-time physical activities
Support Sources:	Spouse, friends, relatives, neighbors and organization
Support Types:	A combined index ($p<.05$) of five kinds of available support sources: 1) Marital status 2) Number and frequency of contact with close friends 3) Number of relatives seen often

(continued)

Table 2-1 (continued)

	4) Number of neighbors known well enough to drop in on 5) Involvement in social, civic, professional or recreational groups or associations
9. Horne (1994)	
Subjects:	630 women at home full time with at least one child under six years of age
Outcome Variable:	Intention of exercise
Support Sources:	Spouse or partner
Support Types:	The degree to which spouse or partner encourage the respondent to participate in physical activity (among active respondents, $p<.05$; among inactive respondent, n.s.)
10. Hovell et al. (1989)	
Subjects:	1789 community residents (1021 males and 768 females, mean age=48.25)
Outcome Variable:	Frequency and duration of walking
Support Sources	Family members and friends
Support Types	1) Frequency with which family members encouraged, exercised with, or offered to exercise with subject ($p<.001$) 2) Frequency with which friends encouraged, exercised with, or offered to exercise with subject (n.s.)
11. Howze, Smith & DiGilio (1989)	
Subjects:	102 previously sedentary older adults (34 males and 68 females, age range=55 to 84)
Outcome Variable	Program attendance level during 6 weeks
Support Sources:	Physician, spouse and significant other
Support Types:	Approval of exercise from physician, spouse and significant others at baseline of support (n.s.)
12. Kelly, Zyzanski & Alemagno (1991)	
Subjects:	264 outpatients (age range=18 to 60)
Outcome Variable:	Change of exercise level during 6-week health promotion program
Support Sources	Family members and others
Support Types	1) The degree of reliance on family to support the respondent in making the exercise change (n.s.) 2) The degree of reliance on others to support the respondent in making the exercise change ($p<.05$)
13. Krause et al. (1993)	
Subjects:	1351 community residents (662 males and 689 females, mean age =68.7)
Outcome Variable:	Frequency of engaging in active sport or exercise, walking and gardening
Support Sources:	Family and friends
Support Types:	A combined index ($p<.001$) of received two types of emotional support for well-being: 1) Frequency of that the closest significant other is willing to listen to the respondent talk about his or her worries and problems. 2) Frequency of that the most important significant other makes the respondent feel loved and cared for.

(continued)

Table 2-1 (continued)

14. Kravitz & Furst (1991)

Subjects:	103 adults
Outcome variable	Exercise class attendance during 16 weeks
Support Sources:	Instructor and exercise class attendant
Support Types:	1) Instructor's verbal encouragement (n.s.) 2) perceived social support from class attendant (n.s.)

15. Lee (1993)

Subjects:	286 community residents (286 females, age range=50 to 64)
Outcome Variable:	Stage of change in exercise
Support Sources:	Family members
Support Types:	Perceived family support: (e.g., my family would pitch in and help so I could have more time to exercise), Action/maintenance >precontemplator ($p<.05$)

16. Lock & Wister (1992)

Subjects:	11181 national survey samples (mean age=40.5 years)
Outcome Variable:	Perceived increased exercise level in the previous year of the survey
Support Sources:	Family members and friends
Support Types:	1) Spouse's regular exercise (n.s.) 2) Number of friends who exercise regularly ($p<.05$)

17. Martin & Mushett (1996)

Subjects:	78 swimmers with disabilities (44 males, 34 females, age range=12 to 44)
Outcome Variable	Athletic self-efficacy
Support Sources:	Friends, parents and coaches
Support types:	1) Listening support: the perception that others genuinely care about what you have to say and listen nonjudgmentally ($p<.05$) 2) Shared social reality support: the belief that others share your understanding of the world (n.s.) 3) Emotional support: the idea that others care about you and are on your side (n.s.) 4) Emotional challenge: the perception that others appreciate and support your efforts and accomplishments in a specific setting (n.s.) 5) Technical challenge: the support encourages the individual to do better or achieve more in a specific setting ($p<.05$)

18. O' Brien Cousins (1995)

Subjects:	327 community residents (327 females, age range=70 to 98, mean age=76.7)
Outcome Variable:	Activity status calculated by duration and intensity (MET units) adjusted for body weight
Support Sources:	Family members, friends, physician, and significant others
Support types:	1) Being part of an athletic family during one's middle years ($p<.001$) 2) Encouragement by at least one person to develop and maintain physical activities ($p<.001$) 3) Encouragement from physicians ($p<.001$) 4) Having friends interested in physical fitness activities ($p<.001$)

(continued)

Table 2-1 (continued)

19. Östergren et al. (1991)

Subjects:	73 consecutive patients under the age of 70
Outcome Variable:	Physical working capacity
Support Source:	Significant others
Support Types:	1) General emotional support for well-being: existence of trustful, reliable, intimate persons (n.s.) 2) General informational support for well-being: existence of persons who could provide advice and information on problems (n.s.) 3) General material support for well-being: existence of persons who could provide goods or money in trouble ($p<.05$)

20. Potts et al. (1992)

Subjects:	936 members of a health maintenance organization (378 males and 558 females, mean age=72.52)
Outcome Variable:	Frequency of exercise
Support Sources:	Family and friends
Support Types:	A combined index ($p<.05$) of the three types of general support sources for well-being: 1) Frequency of contact with family and friends 2) Number of family members and friends to whom the respondents feel close 3) Number of family members and friends with whom contact is maintained and confident relationships

21. Riffle, Yoho & Sams (1989)

Subjects:	109 attendants of meal programs (21 males and 88 females, age range= 56 to 94
Outcome Variable:	Frequency of exercise
Support Sources:	Significant others
Support Types:	A combined index of perceived availability of general emotional, informational, and material assistance for well-being (n.s.)

22. Sallis et al. (1987)

Subjects:	171 university students and staff (43 males, 128 females, mean age=21.3)
Outcome Variable:	Regular physical activity (at least 20 minutes without stopping, three times a week, which is vigorous enough to make you breathe hard and sweat)
Support Sources:	Household family members and friends
Support Types:	A combined index resulted from factor analysis ($p<0.001$) 1) Exercised with me 2) Gave me encouragement to stick with my exercise program 3) Changed their schedule so we could exercise together 4) Offered to exercise with me 5) Gave me helpful reminders to exercise 6) Planned for exercise on recreational outings 7) Discussed exercise with me 8) Talked about how much they are likely to exercise 9) Helped plan activities around my exercise 10) Asked me for ideas on how they can get more exercise 11) Took over chores so I had more time to exercise 12) Made positive comments about my physical appearance

(continued)

Table 2-1 (continued)

23.Sallis et al. (1989)	
Subjects:	1789 community residents (1021 males and 768 females, mean age=48.25)
Dependent Variable:	Frequency of vigorous activity
Support Sources:	Family and friends
Support Types:	1) Frequency with which family members encouraged, exercised with, or offered to exercise with subject (n.s.) 2) Frequency with which friends encouraged, exercised with, or offered to exercise with subject ($p<.01$)
24. Treiber et al. (1991)	
Subjects:	230 elementary school teachers (89 male, 141 females)
Outcome Variable:	Leisure time physical activity
Support Sources:	Household family members and friends
Support types:	Replication of social support measure by Sallis et al.(1987) A combined index of supportive behaviour ($p<.01$)
25. Wankel, Yardley & Graham (1985)	
Subjects:	186 adult females who attended the first session of a 10 week community-based aerobic dance program
Outcome Variable:	Attendance of a 10-week exercise program
Support Sources:	Exercise leaders, exercise class attendant and family members
Support Types:	Structured social support treatment ($p<.05$) based on the three support sources: 1) Exercise leader's support: ongoing interest in the exercise behaviour of the participants, encouraging the participants to establish and maintain their home and buddy support systems, facilitating the development of a positive class atmosphere, and ensuring that the class attendance and social support charts were systematically marked. 2) Buddy support: phone reminders, reinforcement of desired behaviours, encouragement, and shared transportation. 3) Home support: sharing the booklet with family, discussing the problem of irregular attendance.
26. Wankel et al. (1994)	
Subjects:	3679 national survey samples (1733 males and 1946 females)
Outcome Variable:	Intention of involvement in physical activity
Support Sources:	Spouse/boyfriend/girlfriend, parents, son/daughter, other family members, close friends, employer, and doctor
Support Types:	The degree to which people encourage the respondent to participate in vigorous physical activity (9 years old & under, $p<0.1$; 20-39, $p<.001$; 40-59, $p<.001$; 60 & over, $p<.001$)
27. Williams et al. (1991)	
Subjects:	40 patients at a haemodialysis clinic
Outcome variable	Adherence and non-adherence during 12 weeks
Support Sources:	Exercise class attendants
Support Types:	Perceived reinforcement and encouragement from class group ($p<.01$)

(continued)

Table 2-1 (continued)

28. Young, King & Oka (1995)	
Subjects:	326 community residents (185 males and 141 females, age range=50 to 65 years)
Outcome Variable:	Activity level calculated by frequency, duration and intensity
Support Sources:	Significant others
Support Types:	A general index perceived support for well-being ($p<.05$)
29. Zimmerman & Connor (1989)	
Subjects:	116 employees of a local public/private hospital enrolled in a worksite health promotion programs (54 males and 92 females, age range=30 to 39, mean age=38.6)
Outcome variable:	Change in exercise level
Support Sources:	Family, friends, co-workers
Support Types:	Supportiveness ($p<.05$), other's exercise change (n.s.), encouragement ($p<.01$), family helpfulness ($p<.05$), friends' helpfulness (n.s.), co-workers' helpfulness (n.s.)

Among 85 social support items identified in the 29 articles, 42 support items had a statistically significant impact on the outcome variable(s), while the remaining 43 social support items did not. The sources of social support were primarily spouse, children, other family members, peers, exercise instructors and physicians.

In the seven studies employing subjects aged 65 or over (Clark et al., 1995; Howze, Smith & DiGilio, 1989; Krause et al., 1993; O'Brien Cousins, 1995; Potts et al., 1992; Riffle, Yoho & Sams, 1989; Wankel et al., 1994), 11 social support items were significantly associated with the outcome variable(s), whereas four support items were not. Although it is premature to conclude that there is an age-difference in the relationships between social support and physical activity, there is some evidence that social support is even more important to physical activity involvement in older age. For example, Wankel et al. (1994) reported that social support from spouse, family members, friends. and doctor contributed more to the intention of physical activity involvement for

the older population (60 years old or more) than for younger population (less than 60 years old). Sallis et al. (1989) examined the influence of peer support on physical activities in younger women (less than 50 years old) and older women (more than 51 years old). The results showed that the physical activity level of older women was more strongly determined by peer support than was the case for the younger women. O'Brien Cousins (1995) reported that among women over age 70, social support is at least as important as self-efficacy in explaining late life physical activity.

To date, social support measures in physical activity studies have employed operational definitions based on the source of support (e.g., spouse, families and friends, etc.) rather than on the functional or behavioral characteristics of the support. Moreover, the total amounts of support (e.g., one simple measure or one combined index from several measures) have been used frequently in previous studies (e.g., Hibbard, 1988; Potts et al., 1992; Riffle, Yoho & Sams, 1989).

The operational definition of social support differs from study to study. For example, in some studies, social support has been defined as the existence of social relationships or a social network, such as "organizational membership" (Eaton, 1993), "marital status or involvement in social groups" (Hibbard, 1988), "existence of persons who could provide advice and information on problems" (Ostergren et al., 1991), "number of friends who exercise regularly" (Lock & Wister, 1992), or "number of family members and friends to whom the respondents feel close" (Potts et al., 1992).

In contrast, in other studies, social support is defined by the behavioral or functional dimensions of social relationships, such as "the frequency with which friends

encouraged, exercised with, or offered to exercise with subjects" (Sallis et al., 1989), or "approval of exercise from physician, spouse and significant others" (Howze, Smith & DiGilio, 1989). O'Reilly (1989) notes that maintaining the distinctions between functions and existence of social relationships is important for clarifying the differences or relationships between behavioral or structural interventions.

Substantial research has been conducted in other disciplines exploring various positive social influences on health. Although a large number of positive social influences have been identified, there is some agreement that four major dimensions of positive influences can be identified. They are: 1) instrumental (companionship, direct assistance, and tangible aid), 2) emotional (attitudinal and affective assistance in caring about support recipients), 3) informational (knowledge assistance), and 4) esteem support (self-esteem information provision and skill assistance for enhancing self-esteem) (Cutrona, 1990; Sarason & Sarason, 1994; Stansfeld & Marmot, 1992; Vaux, 1992). These four dimensions have been reported to provide different information about supportiveness and to have different effects on health-related outcomes (Courneya & McAuley, 1995; Duncan et al., 1993; Dunkel-Schetter & Bennet, 1990; Gottlieb, 1998).

Negative Social Influences

Although some negative constructs in physical activity settings among older adults have been identified, for example, "perceived barriers" (O'Neill & Reid, 1991; Connell et al., 1994), "environmental barriers" (McPherson, 1994), "leisure constraints" (Crawford, Jackson & Godbey, 1991; Jackson, 1993), "social disapproval" (O'Brien Cousins,

1994,1996), and "stereotypes" (Vertinsky, 1995), there has been a striking absence of research examining negative social influences on physical activity in older adults. Previous studies have tended to focus on personal barriers such as physical, cognitive, and knowledge-based constructs (O'Neill & Reid, 1991). Little attention has been paid to negative aspects of social relationships that may apply in physical activity settings. For example, the most frequently cited perceived barriers among sedentary elderly are "I'm too old" and "physical activity is too risky" (O'Neill & Reid, 1991; Vertinsky, 1995). It is unclear the extent to which such personal negative attitudes (personal disengagement) might have been influenced by a more persuasive negative social climate. The impact of peer statements such as "act your age" has not been studied.

In gerontology, health psychology, and community psychology, many negative social influences have been identified, for example "social hindrance" (Norris, Stephens & Kinney, 1990; Ruehlman & Wolchik, 1988), "social rejection" (Hirsch & Rapkin, 1986), "social inhibition"(Guerin, 1988), "unsupportive behaviors" (Gurowka & Lightman, 1995), "unhelpful behaviors" (Patterson, 1995), "negative social ties" (Burg & Seeman, 1994; Okun, Melichar & Hill, 1990), "social strain"(Rook, 1992), or "negative social interactions" (Krause, 1995; Lakey, Tardiff & Drew, 1994) are all thought to influence subsequent behavior.

Most non-exercise research has reported that negative social influences occur less often than do positive social influences (Finch, et al., 1989; Okun, Melichar & Hill, 1990; Pagel, Erdly & Becker, 1987; Rook, 1992; Schuster, Kessler & Aseltine, 1990). However, several studies have shown that the negative social influences are either as

strong as positive ones (Bernner, Norvell & Limacher, 1989; Lakey, Tardiff & Drew, 1994; Okun, Melichar & Hill, 1990) or even stronger determinants of health outcomes than are the positive ones (Finch, et al., 1989; Pagel, Erdly & Becker, 1987; Schuster, Kessler & Aseltine, 1990). Furthermore, the effects of negative social influences have been reported to be long-lasting compared with those of positive influences, and the effects are more pronounced over a short period (Finch & Zautra, 1992; Krause, Liang & Yatomi, 1989).

Clearly, there is a need for closer attention to the psychometric properties of both positive and negative social influence constructs. Since a comprehensive understanding of social influences requires a consideration of the interplay between positive and negative domains, it is important to more thoroughly investigate the extent to which positive and negative elements of social relationships are related (Finch, et al., 1989). Some studies have reported that positive and negative social influences are only weakly correlated, indicating that they may be independent dimensions rather than opposite ends of one continuous dimension (e.g., Finch et al., 1989; Hirsch & Rapkin, 1986; Pagel, Erdly & Becker, 1987; Ruehlman & Wolchik, 1988; Rook, 1992; Oostrom et al., 1995). For example, an older adult may be surrounded by sedentary peers and perceive that social norms for an active retirement are low, all while his/her physician may be avidly advocating higher levels of physical activity.

Conclusion

Social influences from the interpersonal relationships of older adults have been

recognized as important determinants of their physical activity involvement. However, the existing research has focused primarily on the positive side of social influences such as social support while the measurement of social influences has focused mainly on their sources (e.g., family support or friend support). In order to fully understand the influence of social relationships on physical activity involvement among older adults, more attention should be paid to negative social influences on physical activity. Moreover, the measurement of social influences should take into account both the sources and nature of positive and negative social influences which are mobilized and activated in older adults' social world.

The quality of both research and practice will be enhanced if information about the whole social experience can be marshaled. Currently, the measurement of social influences in the physical activity setting is often too simplistic. For example, many social support studies in community settings have either assessed a single support category or have combined several support types into one index. Such over simplified measures have limited reliability and do not adequately represent the construct that they are attempting to measure. Many researchers have noted that the lack of agreement concerning the conceptualization and measurement of social support has impeded the development of valid generalizations. For progress in understanding social influences it is critical that relevant concepts be identified and differentiated measures be developed and explicitly defined. In order to fully understand the social mechanisms promoting or inhibiting the active lifestyles of older adults, future studies would benefit from careful scrutiny of both positive and negative social influences, how they are communicated, and by whom.

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Chapter 3
A Multidimensional Scale for Assessing Social Influences on Physical Activity in Older Adults

An active lifestyle has been recognized as one of the best contributors to successful aging. Ample research evidence has suggested that regular physical activity reduces the risk of several potentially life-threatening physical conditions, improves psychological and cognitive functioning, and enhances quality of life in later years (Shephard, 1997; U.S. Surgeon General's Report, 1996). Large-scale survey studies commonly show, however, that a sizable percentage of the aging adult population is mostly sedentary (Canadian Fitness and Lifestyle Research Institute, 1996; Stephens & Craig, 1990). There is a need to develop, encourage and promote physical activity for the aging adult population across a broad segment of the community in an effective and efficient manner.

Promoting healthy behavior by bolstering various positive social influences through interpersonal community ties is an attractive option to professionals and policy makers, because of the low cost, flexibility, and orchestrated effects of interpersonal empowerment (Edwards, 1990; Wellman & Hall, 1986). Another factor adding to the appeal of social influence interventions in community ties is their ecological validity (Gottlieb, 1988). Thus, interventions arising from and affecting the natural social context in which people are enveloped can reach historically under-served populations such as inactive older adults.

On the other hand, the breadth of social influence interventions often causes disorganized, unsystematic or ambiguous implementation strategies. As King (1991) pointed out, a "kitchen sink" approach has been generally implemented by which an array

of strategies are delivered throughout the community or community setting with the hope that something will "catch" (p.249). A crucial question which needs to be answered first is "how can we conceptualize the social influence constructs and how should we assess them to set the goals or targets for practical interventions?"

However, little attention has been paid to exploring or conceptualizing various types of social influences specific to physical activity of the older adult population. Previous studies have treated social influence as if it were a unidimensional or global entity and have not extended their analytical scope to the possibility of the multidimensional nature of social influences. This unidimensional perspective is manifest in two major ways within existing assessments of social influences. First, the past decade of research in physical activity sciences has overly emphasized the positive social influences, such as social support, almost always to the exclusion of their negative properties (Chogahara, O'Brien Cousins & Wankel, 1998). There has been an implicit assumption that social positivistness and negativity are opposite ends of a continuum, and the presence of social positivistness is synonymous with the absence of social negativity (and *vice versa*). However, several investigators (e.g., Krause, 1995; Rook, 1992) have noted that this one-sided perspective fails to take into account the proposition advanced by exchange theorists, that social relationships entail costs as well as benefits. In this perspective, negative social influence is a distinct concept unrelated to positive social influence and, accordingly, must be measured separately. There is a clear need for closer attention to test whether these positive and negative social influence properties are independent or interdependent in the contexts of physical activity among older adults.

The second level of unidimensionality is seen in a global trait-like characterization of positive social influence in physical activity. For example, many social support studies in community settings have either assessed a single support category or combined several support types into one index. Few studies have examined several components of behaviors supportive of the physical activity of the older adult population. Efforts to develop taxonomies of conceptually-distinct unsupportive behaviors have lagged further behind efforts to develop taxonomies of supportive behaviors. It seems likely that an understanding of major types of negative social influences might be important to the gerontology of physical activity, because existing research has suggested that the frailty of older adults is influenced by social disengagement, which has been perpetuated through stereotypes (O' Brien Cousins, 1998; Vertinsky, 1995) and ageism in society (McPherson, 1994; Spirduso & Gilliam-MacRae, 1991).

In the present study, a new measure based on the multidimensionality of social influences specific to physical activity of older adults was proposed, and different types of positive and negative social influences were examined. Special attention was focused on the following two research questions, through demonstrating the structural validity of the hypothesized two-level multidimensional conceptualization of the measurement:

Research Question 1: Are positive and negative social influences opposite ends of a continuum, or are they independent domains in the context of the physical activity of older adults?

Research Question 2: If the above independency is assumed, are these positive and negative social influences further divided into some distinct subdimensions?

Scale Construction

Conceptualization and Item Generation

Since the major threats to content validity are underrepresentation and irrelevancy of the target measurement construct (King, Mattimore, King & Adams, 1994; Suurmeijer et al., 1995), the scale construction stage involved a multi-source approach using a variety of information-gathering approaches, including a review of the related literature, interviews, and feedback from older adults and health professionals, to increase the breadth as well as the relevancy of the construct. The interviews and feedback from older adults and health professionals were thought to improve the content validity of the items and reduce the bias that would have been involved had the investigator developed items based solely on theoretical considerations (Sallis, Grossman, Pinski, Patterson, & Nader, 1987).

1. Concept analysis

A review of 174 related studies and 56 scales, and three rounds of semi-structured interviews with 20 older adults who varied in their physical activity levels, identified 41 supportive and 33 unsupportive behavioral components that could be classified into three dimensions of positive social influence: companionship support, informational support and esteem support; and three dimensions of negative social influence: inhibitive behavior, justifying behavior and criticizing behavior (detailed information on these dimensions is presented later). These concept analyses focused on behavioral aspects of the positive and negative social influences on physical activity. Therefore, the selected components pertained to the actions or statements actually provided by others and not merely the

perceived attitudinal or affective component. Behavioral specificity was emphasized in order to minimize the need for subjective inferences and to enhance the concreteness of target actions of intervention efforts (Barrea, Sandler & Ramsay, 1981; Sallis et al., 1987)

2. Generation and Refinement of Question Items

Next, items expressing the selected components were created by referring to items from reviewed scales and comments from older adult interviewees. The samples of question items were reviewed by two experts in the social psychology of exercise as well as two practitioners working for health promotion for older adults. Based on their suggestions and feedback, the wording and phrasing of the items were revised. After the revision, five independent judges, graduate students in the social psychology of exercise, were provided with the definitions of the six dimensions and the list of items, and were asked to sort the items into the six dimensions. Only those items on which all five judges agreed were retained. Finally, the retained items were presented to 43 older adults who varied in their levels of physical activity involvement. They were asked to answer the questions and also to circle any words or phrases that they did not understand. This exercise was designed to ensure that the instrument did not contain ambiguous or difficult wording. The end result of this multi-stage verification of item content and item expression was the 31-item preliminary measure of the positive and negative social influences on the physical activity of older adults.

Question Format and Source of Social Influences

Social support research has suggested that utilizing only the functional approach

(i.e., types of social influences) leaves a vague understanding of "who actually influenced?" (Hirsch & Rapkin, 1986). An experimental examination using the question "How often have people done so?" found that this format left the word "people" ambiguous. The reviewed literature identified three distinct major categories of sources of social influences: 1) family members, 2) friends, and 3) experts (health professionals, practitioners and volunteers). Some theorists (Argyle, 1992; Rose, 1990; Vaux, 1992) have suggested that these three types of sources are different in nature and have different roles in providing social influences. In order to clarify the nature of, and roles served by, these different social influence sources, the participants were asked to rate separately the frequency with which family, friends, and experts (health professionals) had done or said what was described in the item. For the response format, a 5-point frequency scale, ranging from 0 (never) to 4 (very often), was used to measure the occurrence rates of activated social influences during the 12 months preceding the survey. This time frame was selected as the interviews and pre-tests indicated that three-month and six-month time frames were too short to adequately register the low occurrence of negative social influences, while previous gerontological research had reported time frames of more than one year to be problematic for recall (Rodgers & Herzog, 1992).

Method

Participants

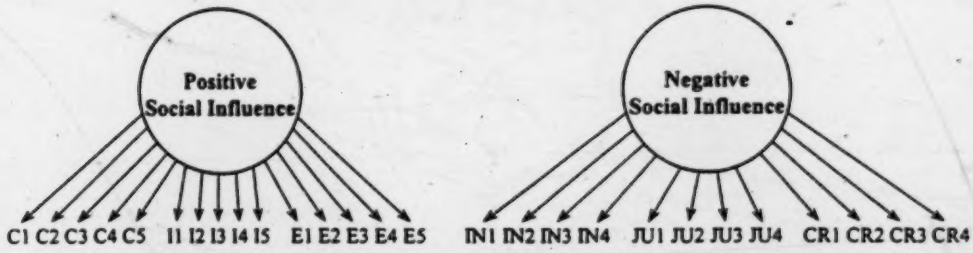
A questionnaire survey was conducted at 51 different venues including senior citizen centers, senior apartments, senior lodges and community senior groups in the city

of Edmonton in 1997. The selection of these sites was based on two directories: *1997 Directory of Senior Services* and *Senior Citizens' Accommodation*. After getting permission from the directors, the researcher approached respondents at the beginning or the end of programs or meetings and asked them to complete a questionnaire. In total, 681 people agreed to fill out the questionnaire and all the participants gave informed consent to the researcher. The cases with missing data on the social influence scale were dropped in the analysis stage, resulting in a final sample of 479. There were no statistically significant differences between the retained and dropped cases in their age, gender, self-rated health status or activity level, compared to others of the same age and gender. The participants for the analysis ranged in age from 55 to 96 years (M=73.8 SD= 8.4). There were 133 (27.8%) males and 346 (72.2%) females. Forty-three percent of the participants were married, and 28% reported that they were born outside Canada.

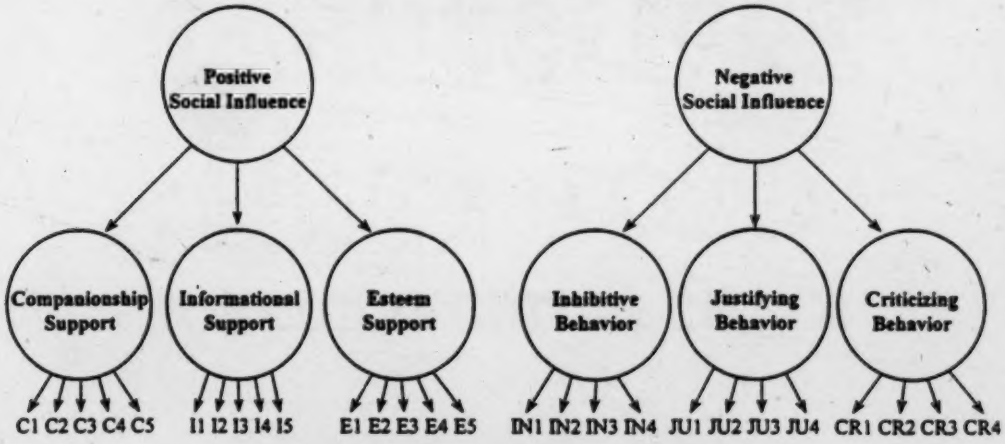
Model Specifications

The conceptual validity of the proposed scale was tested by a comparison with two alternative conceptual models that have been the basis for previous measurements of social influences on physical activity. The model comparisons were conducted by a series of confirmatory factor analyses (CFA) using PRELIS 2 and LISREL 8 programs (Jöreskog & Sörbom, 1996). Confirmatory factor analysis can be used to provide a more rigorous and systematic test of alternative conceptual models than is possible within the framework of exploratory factor analysis (Byrne, 1989). Three models reflecting different conceptualizations of social influence were set (Figure 3-1).

Model 1. One first-order factor (Total unidimensional model)


Positive
Social Influence
Negative
Social Influence
C1 C2 C3 C4 C5 I1 I2 I3 I4 I5 E1 E2 E3 E4 E5
IN1 IN2 IN3 IN4 JU1 JU2 JU3 JU4 CR1 CR2 CR3 CR4

Model 2. Two first-order factors (Independent positive and negative model)



Model 3. Two second-order and six first-order factors (Multidimensional positive and negative model)

Figure 3-1. Three Alternative Conceptual Models of the Social Influence on the Physical Activity of Older Adults. Circles indicate hypothesized latent factors, and measured indicators are shown in C (companionship), I (information), E (esteem), IN (inhibitive), JU (justifying) and CR (criticizing).

Model 1 posits the existence of a single general factor of social influence and indicates that all of the items are measuring the same thing. Support for this model would indicate that positive and negative social influences were dependent on each other, and thus no dimensions would exist regarding positive and negative social influences (total unidimensional model). Model 2 is conceptualized with two factors representing positive and negative social influences; therefore, the independency of positive and negative social influences is supported. However, the two dimensions do not have subdimensions, and thus, both were considered as having global trait-like characteristics. Model 3, the target model in this study, is characterized as more multidimensional than Model 2. It postulates not only the independence of positive and negative social influences, but also separate subdimensions within both positive and negative social influences.

Analysis Procedures

Three separate CFA were performed for family, friend, and expert data sets. In data inputs, to avoid redundant items, if two candidate items in either data set were correlated above 0.8, only the item which had a more skewed distribution than the other was deleted from the data sets. The three separate variance-covariance matrices among the selected 27 variables were computed by PRELIS and used as data input, and maximum likelihood estimations were employed[2]. Inspection of the univariate frequency distributions for each of the indicators involved in the measurement model revealed several variables, particularly the indicators of negative social influences, to be appreciably right-

[2] The variance-covariance matrices used as data input are available on request.

skewed and leptokurtic. Because maximum likelihood estimation is likely to have inflated chi-square values and to underestimate standard errors when variables have non-normal distribution, an alternative estimation method was also employed for the self-blame model with EQS 5.0 for Windows (Bentler, 1995), specifying a ROBUST maximum likelihood method. Results indicated the blame model did not differ in parameter significance from the maximum likelihood model and showed acceptable levels of Corrected Comparative Fit indexes for the target models in family, friend, and expert data sets. Because the ROBUST method did not indicate any appreciable biases, only the maximum likelihood estimates by LISREL 8 were used to compare the three measurement models.

Based on the recommendation of Hu and Bentler (1995), and West, Finch and Curran (1995), model fit was assessed by the following various total fit indexes. First, the chi-square statistic was employed to test whether there was a significant difference between the observed data and the data that could be explained by a model. The chi-square is, in reality, a "badness-of-fit" index, and thus a nonsignificant chi-square is indicative of a good fit. However, it is highly sensitive to the sample size, complexity of the model and non-normal distribution of the data. Therefore, other fit indexes, goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), incremental fit index (IFI) and comparative fit index (CFI) were used. GFI indicates an overall degree of fit of the predicted square residuals compared to the actual data, and AGFI is an adjusted GFI for degrees of freedom. Both IFI (type 2) and CFI (type 3) compare the fit of each model relative to the null model, which specified no common factors. Values above .900 for these indexes are generally considered to indicate a good fit. After examining all of these

model fit indexes, the goodness-of-fit of the individual parameters of the best-fit model were checked by examining the factor loading scores. Finally, the reliability of confirmed subscales was calculated. The internal consistency of the subscales was computed using Cronbach's alpha coefficients. Alpha coefficients greater than .7 were expected (Okolo, 1989). The stability of subscales was examined by test-retest reliability over a 2-week period in a subset of 59 subjects in this study. Because the social influence subscales represent a contextual measure (specific to physical activity) and not a global measure (or trait) as such (Teresi & Holmes, 1994), test-retest correlations greater than 0.50 were required (Helminen, Halonen, Rankinen, Nissinen, & Rauramaa, 1995; Neuman, 1997).

Results

Model Evaluation

Table 3-1 shows the fit statistics from CFA for each factor model. In general, the more multidimensional the model, the better the fit. Although Model 1 and Model 2 differ only in the distinctiveness of positive and negative social influences, Model 2 showed a better fit across family, friend and expert scores, suggesting that the orthogonality of the positive and negative influence constructs is robust. Model 3 provided a better fit for the data than did Model 2, supporting the validity of the multidimensional conceptualization of positive and negative social influences. Specifically, Model 1 and Model 2 had significant chi-square values, and none of the alternative fit index values was above the .900 cutoff, indicating poor fit. Only Model 3 had a nonsignificant chi-square $\chi^2(318)=305.87$, $p=0.68$ in family, $\chi^2(318)=289.56$, $p=0.87$ in friend, and $\chi^2(318)=328.81$, $p=0.33$ in expert scores,

suggesting there were not significant differences between the observed data and the data that was explained by Model 3. Other fit indexes, GFI, AGFI, IFI, and CFI, all exceed the recommended minimum of .90 for Model 3 in the family, friend and expert scores. The GFI values for Model 3 indicate that the models accounted for 95% of the variance in the family, 96% in the friend and 95% in the expert data. These findings strongly indicate that the target model provided a good fit for the data.

TABLE 3-1. Summary of Total Fit Statistics

Model	χ^2 (N=479)	*df*	*p*	GFI	AGFI	IFI	CFI
Family Scores							
Model 1	1598.85	324	<.001	.70	.65	.56	.56
Model 2	743.46	324	<.001	.87	.85	.86	.85
Model 3	305.87	318	n.s.	.95	.95	1.00	1.00
Friend Scores							
Model 1	1621.60	324	<.001	.68	.63	.55	.55
Model 2	682.99	324	<.001	.88	.86	.88	.87
Model 3	289.56	318	n.s.	.96	.95	1.00	1.00
Expert Scores							
Model 1	1649.94	324	<.001	.68	.63	.59	.59
Model 2	693.40	324	<.001	.88	.86	.89	.89
Model 3	328.81	318	n.s.	.95	.94	1.00	1.00

GFI=goodness-of-fit index; AGFI=adjusted goodness-of-fit index; IFI=incremental fit index; CFI=comparative fit index

Relating first-order factors to individual items

Standardized factor loadings for the items representing the six first-order factors in Model 3 are presented in Table 3-2. Each item was forced to have zero loadings on all factors other than the one to which it was assigned. All off-diagonal elements of the theta delta (TD) matrix of errors in measurement were fixed to zero, consistent with the expectation of uncorrelated disturbance terms. There similar factor loading patterns

emerged across the family, friend and expert scores. All items had loadings over .70 except the first item of criticizing behavior from experts (CR1: .69), and all were statistically significant ($p<.001$).

Relating second-order factors to first order factors

Standardized maximum parameter estimates for the structural relations among the six first-order-factors and two second-order factors are shown in Figure 3-2. The path arrows from the second-order factors (positive and negative) to their first-order factors depict the loadings of the first-order factors on the second-order factors. No cross-loadings were conducted. As hypothesized, companionship support, informational support and esteem support were caused by their higher-order construct of positive social influence, while inhibitive behavior, justifying behavior and criticizing behavior were caused by their higher-order construct of negative social influence. All the factor loadings were statistically significant ($p<.001$). Differences across the three sources of influence were negligible. When the orthogonality constraints were relaxed in the LISREL models, the relationships between the positive and negative constructs were .14 (family), .15 (friends), .18 (experts), suggesting that the two constructs are relatively uncorrelated rather than inversely correlated in each source of influence[3].

[3]When the orthogonality constraints were relaxed between Esteem Support suggesting "You are good" and Criticizing Behevior suggesting "You are not good at doing physical activity", the relationships between the two factors were -.092 for family, .011 for friends, and .097 for experts

TABLE 3-2. Standardized Maximum Likelihood Parameter Estimates for the 27 items of Six First-order Factors in Model 3.

Question Item[a]	*Factor Loading* *Family*[b]	*Friend*[c]	*Expert*[d]
Construct 1: Positive Social Influence People's comments and actions which encourage involvement in physical activity			
Subscale 1. Companionship Support: partnership assistance that suggests "We participate together"			
C1)made plans with you for doing a physical activity together?	.88	.87	.73
C2)teamed up with you to engage in a physical activity together?	.91	.91	.92
C3)promised you that they would participate in a physical activity with you?	.93	.94	.94
C4)given you helpful reminders to do a physical activity together with them?	.93	.88	.93
C5) changed their schedules so you could do a physical activity together with them?	.93	.84	.81
Subscale 2. Informational Support: Knowledge assistance that suggests "You should know"			
I1)informed you about the expected positive effects of a physical activity on your health?	.73	.76	.76
I2)explained to you why a physical activity is important to improve your health?	.86	.86	.82
I3)clarified for you how you may achieve your health goals through a physical activity?	.89	.86	.95
I4)suggested a physical activity program or facility which might assist your health?	.81	.80	.92
I5)explained to you about the amount or intensity of physical activity necessary for improving your health?	.83	.87	.90
Subscale 3. Esteem Support: Esteem information provision that suggests "You are good"			
E1)complimented you on the mastery of a physical activity skill?	.84	.87	.89
E2)praised you that your physical activity level is superior to that of other people your age?	.80	.82	.86
E3)affirmed that you have done well in your physical activity?	.93	.89	.92
E4)shown their respect for your versatility in physical activity?	.92	.90	.92
E5)told that you should be proud of your physical activity skills?	.91	.89	.94
Construct 2: Negative Social Influence People's comments and actions which discourage involvement in physical activity			
Subscale 4. Inhibitive Behavior: disapproval and discouraging behaviors that suggest "You should not do physical activity"			
IN1)warned you that starting a physical activity would worsen your health?	.89	.90	.96
IN2)advised you to avoid a physical activity in order to avoid injury or ill health?	.93	.92	.97
IN3)told you that you should keep away from a physical activity in order not to have falls or accidents?	.80	.80	.87
IN4)forbidden you to engage in a physical activity because of the potential health risk?	.84	.81	.87
Subscale 5. Justifying Behavior: excusing and overprotective behaviors that suggest "You don't need to do physical activity"			
JU1)told you that more physical activity is not necessary for you because you are already busy in your other daily routines?	.90	.89	.96
JU2)told you that you do not need to do more physical activity because you are healthy enough?	.91	.90	.90
JU3)told you that you do not need to do more physical activity because you know how to care for your health?	.85	.86	.90
JU4)told you that more physical activity is not necessary for you because you have not had any health problems?	.82	.88	.91
Subscale 6. Criticizing Behavior: demanding and blaming behaviors that suggest "You are not good at doing physical activity"			
CR1)excluded you because of your low ability in a physical activity?	.78	.75	.69
CR2)forced you to do a physical activity which you disliked?	.76	.80	.71
CR3)complained that your skill in a physical activity is not good enough?	.90	.91	.86
CR4)criticized your low skill level in a physical activity?	.92	.91	.93

[a] The questions were asked "During the past 12 months, how often have your family, friends and experts . . ."
[b] Defined as wife/husband, sister/brother, child/grandchild, other relatives, etc.
[c] Defined as close friend, new acquaintance, neighbor, co-worker, club members, etc.
[d] Defined as physician, nurse, physical therapist, exercise/sport instructor, other health-related professionals, practitioners and volunteers, etc.

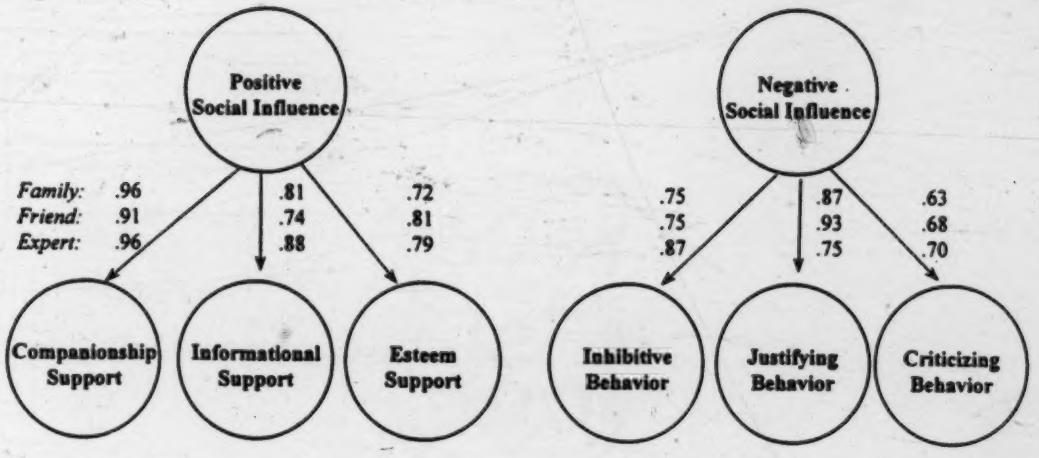


Figure 3-2. Standardized Maximum Likelihood Parameter Estimates for the Two-Order-Factors Model.

In sum, the two-order factor model of social influence (Model 3) was confirmed by both the total fit indexes and individual parameter fit indexes. This model was consistent across the three sources of influence (i.e., family, friends, and experts). From a practical point of view, because both the first and second-order factor loadings are of sufficient magnitude, and the fit of the model to the data was acceptable, there is some justification for proceeding with the use of composite indicators of both the six first-order factors and the two second-order factors in each source score: family, friend and expert. In the next section, the psychometric properties of the subscales using these composite indicators are presented.

Psychometric properties of the subscales

To assess the reliability of subscales confirmed by CFA, the score of each subscale was computed. This was achieved by simply adding the responses for all items in each of the six first-order factors (i.e., 5 companionship, 5 informational, 5 esteem, 4 inhibitive, 4 justifying, and 4 criticizing items) and all items in both of the two second-order factors (15 positive and 12 negative items). This calculation was conducted separately for the family, friend and expert scores.

The internal consistency (alpha) coefficients and two-week test-retest reliability for each of the scales are given in Table 3-3. A retest interval of two-weeks was chosen to ensure that any changes seen in scores would represent random fluctuations in instrumentation and not real changes in receiving social influences. Furthermore, it was expected that a two-week interval would be long enough so that subjects would remember little in terms of their previous responses, especially given the length of the questionnaire. Stability was assessed using the Pearson correlation coefficient for each of the subscales.

Table 3-3. Internal Consistencies and Stabilities of Social Influence Subscales.

Subscales	Family		Friend		Expert	
	Alpha[a]	Stability[b]	Alpha[a]	Stability[b]	Alpha[a]	Stability[b]
First-order factors						
Companionship support	.907	.858[c]	.890	.877[c]	.822	.593[c]
Informational support	.833	.715[c]	.841	.792[c]	.899	.768[c]
Esteem support	.908	.671[c]	.896	.747[c]	.911	.773[c]
Inhibitive behavior	.813	.900[c]	.794	.908[c]	.891	.770[c]
Justifying behavior	.808	.624[c]	.821	.514[c]	.873	.501[c]
Criticizing behavior	.746	.897[c]	.707	.517[c]	.637	.616[c]
Second-order factors						
Positive influences	.920	.790[c]	.917	.845[c]	.924	.794[c]
Negative influences	.851	.852[c]	.847	.799[c]	.865	.711[c]

[a] N=479. [b] N=59, [c] P<.001

Except for the subscale "criticizing behaviors from experts", which had an alpha value of .637, all the alpha coefficients exceeded .70. Thus, while most of the subscales showed adequate internal consistencies, the "criticizing behaviors from experts" subscale should be investigated further. Test-retest stabilities of the subscales ranged from .501 (justifying behaviors from experts) to .908 (inhibitive behavior from friends), indicating all the stabilities exceeded .50. Overall, although the data were based on recollection for the past 12 months, these findings provide support for the reliability of the subscales.

Discussion

This paper reports on the development of a multidimensional measure designed to assess various types of both positive and negative social influences on the physical activity of older adults. A two-order factor model was hypothesized, and its conceptualization was tested through a series of confirmatory factor analyses. The hypothesized structure was confirmed, and the subscales were shown to have adequate internal consistency and test-retest reliability. The findings suggest the following conceptual and methodological implications.

First, negative social influence was a distinct concept relatively unrelated to positive social influence; therefore, these two constructs are not opposite ends of a continuum. This finding points to the importance of distinguishing the presence of encouraging behaviors from the absence of discouraging behaviors (and *vice versa*). Methodologically, this finding suggests that the common practice of assessing social support by means of scales measuring "unhelpful/helpful," "unsupportive/supportive," or

"discourage/encourage" is inappropriate. As Hirsch and Rapkin (1986) indicated, such scales do not measure support, but rather some composite of supportive and unsupportive behaviors. Similarly, if the negative items are reverse scored and combined with the positive components, the unique effects of negative social influences would be lost in analyses using this scoring method. Future investigators should assess the level of both supportive and unsupportive behaviors in a parallel manner. Researchers or practitioners may fail to effectively design interventions to promote physical activity among older adults if they assess only the positive side of social relationships. Interventions may be designed not only to increase the supportive interactions but also to decrease the negative interactions such as inhibitive behaviors, justifying behaviors and criticizing behaviors.

The findings also confirmed that the positive and negative social influences were further divided into subdimensions. This was demonstrated by the superiority of Model 3 with subdimensions over the Model 2 without subdimensions. Therefore, it is clear that the positive and negative social influences were not solely unidimensional. The two constructs can be meaningfully distinguished, and each subdimension possesses unique information. One advantage of using the scores of these subdimensions would be that it provides detailed meanings for the various positive and negative social influences on the physical activity of older adults. More organized and detailed information on the positive and negative social influences is useful in order to comprehend what constitutes the social world of physical activity for older adults. Another merit is that the concreteness or embodiment of interventions is enhanced by presenting more detailed goals or actions. For example, the major concepts underlying the positive and negative social influences tell

us what we could target to increase the positive social influences as well as decrease the negative social influences to promote physical activity among older adults.

A unique feature of the new scale is that it not only addresses different types of social influences, but also "who" provides different levels of these distinct types. While the independence of positive and negative social influences has been well-established in gerontology, some researchers suggest that it may depend upon the level of measurement to reveal. For example, Schuster et al (1990) found that the positive and negative social influences were substantially related (r>.50) when respondents were rating their family members. Thus, positive and negative social influences may be related when persons provide information about a specific group. The data of the present study, however, showed that the independence of the positive and negative social influences were found even when analyses were conducted separately for family, friends and experts. This result may have an important implication because it suggests that supportive and unsupportive behaviors are not subgroup-specific: family members are not solely supportive nor solely unsupportive, and neither are friends and experts. Family, friends, and experts do not constitute homogeneous groups in terms of their supportiveness of the physical activity of older adults.

It is important to bear in mind the limitations of the study. First, although the sample of this study was from diverse locations in the city area, it was not representative of the overall population, based on random sampling procedures. Therefore, the results and conclusions have reduced generalizability. Second, 202 (29.7%) subjects with missing data on the social influence scale were deleted from the analysis. Even though significant

differences were not shown between the dropped and retained samples with regards to their age, gender, self-rated health status and activity level, the possible influences of this nonresponse bias are not known. Third, the concepts of peoples' supportive and unsupportive behaviors and their effects on the physical activity of older adults are undoubtedly broad and complex. There might have been other important supportive and unsupportive behaviors that were not elicited or were eliminated through the item generation processes. With these limitations and concerns in mind, it should be made clear that the present findings represent only a beginning for the examination of social influences on the physical activity of older adults. Further research in this area is required to replicate the present findings with different older adult populations and to investigate other measures based on different conceptual frameworks.

In sum, this research is the first attempt to develop an empirically based taxonomy of both positive and negative social influences on the physical activity of older adults. Although additional research is needed to further establish its psychometric properties, the scale would appear to be a useful tool for investigating the social world of physical activity among older adults.

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Chapter 4
The Benefits and Costs of Social Relationships: The Positive versus Negative Effects of Social Influence on Physical Activity of Older Adults

The development of behavioral strategies that can effectively promote more active lifestyles in the middle-aged and older adult population has become a primary focus of investigation for exercise gerontologists and physical activity scientists. However, current initiatives and their theoretical orientation place disproportionate emphasis on the change in personal attributes (e.g., attitudes, intentions, self-efficacy) among individual exercise participants (Dishman, 1994). Social relationships are expected to have a significant role in physical activity settings, as research indicates that more than 65% of those who exercise choose to do so in groups rather than alone (Courneya & McAuley, 1995). Therefore, more studies are needed to identify interventions that integrate social influence constructs at the community and society levels (Carron, Hausenblas & Mack, 1996).

The past decade of research in the physical activity sciences has exclusively emphasized the positive side of social influences such as social support (Chogahara, O'Brien Cousins & Wankel, 1998). Recently, however, the conceptualization of social influence as a solely supportive construct has been questioned. Several investigators (e.g., Burman & Margolin, 1992; Krause, 1995; Rook, 1992) have noted that this one-sided perspective fails to take into account the proposition advanced by exchange theorists that social relationships entail costs as well as benefits. Therefore, social influences from people may have two distinct aspects: positive and negative. Recent studies in health promotion suggest that although negative behaviors (e.g., discouraging and criticizing

actions) occur less often than positive behaviors (e.g., encouraging and praising actions), negative behaviors are as strong as (Bernner, Norvell & Limacher, 1989; Lakey, Tardiff & Drew, 1994; Okun, Melichar & Hill, 1990), or even stronger than the positive behaviors (Finch, Okun, Barmera, Zautra & Reich, 1989; Pagel, Erdly & Becker, 1987; Schuster, Kessler & Aseltine, 1990).

Existing research in the physical activity sciences has considered social positiveness and negativity to be the opposite ends of a continuum (i.e., positive behaviors and negative behaviors are polar opposites that define one social support domain), while the distinct nature of the two constructs is rarely examined. However, as research on social support increasingly focuses on the whole community, it becomes more important to understand the full range of ways in which social relationships can affect physical activity. It seems likely that social negativeness might be particularly important to the gerontology of physical activity, as current research suggests that the frailty of older adults is influenced by social disengagement which has been perpetuated through negative stereotypes on aging (O'Brien Cousins, 1998; Vertinsky, 1995) and "ageism" in people and society (McPherson, 1994; Spirduso & Gilliam-MacRae, 1991). Because of the potential importance of social negativeness toward older adults' physical activities, the present study simultaneously scrutinized positive and negative social influences as perceived by older adults themselves. The purpose of this study was to examine the relative impact of the effectiveness of positive social influences and the disruptiveness of negative social influences on physical activity involvement among older adults.

In addition, this study extended the analytical scope from a simple comparison

between the positive and negative constructs to the clarification of the circumstances when the relative impact of each would change. Theorists have suggested that the effectiveness and disruptiveness of positive and negative social influences may depend on who provides these influences (Felton & Berry, 1992; Ruehlman & Wolchik, 1988). However, empirical research on social relationships in gerontology has only recently begun to address this issue (Rook, 1992). According to social support research and physical activity research, there are three major distinct sources of social influences: family members, friends, and professionals. These three sources fulfill different roles in overall social influence, and are fundamental social actors who must be taken into consideration when designing health promotion interventions in communities (Argyle, 1992; Rose, 1990; Vaux, 1992). In the present study, the relative impact of positive and negative social influences according to family, friends and health experts was examined. Special attention was directed at testing the detrimental effects of negative social influences on the physical activity in older adults, and whether or not these were more pronounced if provided from family members, friends, or health professionals.

Methods

Participants

A questionnaire survey was conducted at a variety of public and private venues, including senior citizen centers, senior apartments, senior lodges, and community senior groups in the city of Edmonton in 1997. The selection of sampling sites was based on two directories: *1997 Directory of Senior Services* and *Senior Citizens' Accommodation*,

which were obtained from the Society for the Retired and Semi-Retired. The choice of these directories was based on their comprehensiveness and suitability for use in reaching various older adult groups in the city area. Among the listed sites in these directories, extended care centers and nursing homes were excluded due to the anticipated difficulties for the residents to participate in self-administered questionnaires. This exclusion resulted in a total of 87 programs and sites. These prospective sampling sites were contacted and 51 locations agreed to participate in the survey. After obtaining permission from the directors or residence managers, the researcher approached individuals or groups of respondents at the beginning or the end of programs or meetings, and asked them to complete a questionnaire. In total, 681 people agreed to fill out the questionnaire and all the participants gave written informed consent to the researcher. Two weeks later, 59 respondents from one senior community group and one senior apartment completed the questionnaire for the second time, for the purpose of assessing test-retest reliability. The cases with missing data on the social influence scale were dropped in the analysis stage, resulting in a final sample of 479. There were no statistically significant differences between the retained and the dropped cases in terms of age, gender, self-rated health status or activity level, compared to others of the same age and gender. The participants for the analysis ranged in age from 55 to 96 years (M=73.8 SD= 8.4). There were 133 (27.8%) males and 346 (72.2%) females. Forty-three percent of the participants were married, and 28% reported that they were born outside Canada.

Measures

Positive and Negative Social Influences on Physical Activity of Older Adults

This measure was developed to jointly assess the positive and negative social influences of family members, friends and health professionals, specific to physical activity involvement in older adults. Positive social influences were defined as people's comments or actions which encourage involvement in physical activity, whereas people's comments or actions which discourage involvement in physical activity were considered as negative social influences. Both influences were further divided into three subscales. The content and the number of questions for each subscale of positive influences were: 1) companionship support: partnership assistance that suggests "we participate together" (five items); 2) informational support: knowledge assistance that suggests "you should know" (five items); and 3) esteem support: esteem information provision that suggests "you are good" (five items). Subscales of the negative social influences were: 1) inhibitive behavior: disapproval and discouraging behavior that suggests "you should not do physical activity"(four items); 2) justifying behavior: excusing and overprotective behavior that suggests "you don't need to do physical activity" (four items); and 3) criticizing behavior: demanding and blaming behavior that suggests "you are not good at doing physical activity" (four items). The question items were randomly ordered in each of the positive and negative domains. Subjects were asked to rate separately the frequency with which family, friends, and health professionals had done or said what was described in the item during the previous 12 months. A 5-point scale, ranging from 0 (never) to 4 (very often), was used. Confirmatory factor analyses using LISREL 8 (Jöreskog & Sörbom,

1996) indicated that the two-order factor model, composed of the positive and negative domains and their three subdomains, provided a good fit across each of the family, friend and expert data sets (Goodness of fit index=.95, .96, .95, respectively), and all the factor loadings were significant ($p<.001$, see Table 4-1). These analyses suggested justification for proceeding with the use of both the two domain scores and six subscale scores across the three sources. In the present study, the scores from the two domain (total positive and total negative scores) in the family, friend, and expert categories were used because the major interest was to examine the relative impact of positive and negative social influences on physical activity[4]. The total scores were created by adding responses for all items in each domain and dividing them by the number of items (positive=15 items, negative=12 items).

[4] The six subscale scores were not used because of the multicollinearity problem in regression analyses caused by high correlations among the positive influence subscales as well as the negative influence subscales.

TABLE 4-1. Standardized Maximum Likelihood Parameter Estimates for Second-Order Factor Model.

Question Item[a]	*Factor Loadings* *Family*[b]	*Friend*[c]	*Expert*[d]
Positive Social Influences (second-order factor)			
Companionship Support (first-order factor)	**.96**[e]	**.91**[e]	**.96**[e]
C1)made plans with you for doing a physical activity together?	.88	.87	.73
C2)teamed up with you to engage in a physical activity together?	.91	.91	.92
C3)promised you that they would participate in a physical activity with you?	.93	.94	.94
C4)given you helpful reminders to do a physical activity together with them?	.93	.88	.93
C5) changed their schedules so you could do a physical activity together with them?	.93	.84	.81
Informational Support (first-order factor)	**.81**[e]	**.74**[e]	**.88**[e]
I1)informed you about the expected positive effects of a physical activity on your health?	.73	.76	.76
I2)explained to you why a physical activity is important to improve your health?	.86	.86	.82
I3)clarified for you how you may achieve your health goals through a physical activity?	.89	.86	.95
I4)suggested a physical activity program or facility which might assist your health?	.81	.80	.92
I5)explained to you about the amount or intensity of physical activity necessary for improving your health?	.83	.87	.90
Esteem Support (first-order factor)	**.72**[e]	**.81**[e]	**.79**[e]
E1)complimented you on the mastery of a physical activity skill?	.84	.87	.89
E2)praised you that your physical activity level is superior to that of other people your age?	.80	.82	.86
E3)affirmed that you have done well in your physical activity?	.93	.89	.92
E4)shown their respect for your versatility in physical activity?	.92	.90	.92
E5)told that you should be proud of your physical activity skills?	.91	.89	.94
Negative Social Influences (second-order factor)			
Inhibitive Behavior (first-order factor)	**.75**[e]	**.75**[e]	**.87**[e]
IN1)warned you that starting a physical activity would worsen your health?	.89	.90	.96
IN2)advised you to avoid a physical activity in order to avoid injury or ill health?	.93	.92	.97
IN3)told you that you should keep away from a physical activity in order not to have falls or accidents?	.80	.80	.87
IN4)forbidden you to engage in a physical activity because of the potential health risk?	.84	.81	.87
Justifying Behavior (first-order factor)	**.87**[e]	**.93**[e]	**.75**[e]
JU1)told you that more physical activity is not necessary for you because you are already busy in your other daily routines?	.90	.89	.96
JU2)told you that you do not need to do more physical activity because you are healthy enough?	.91	.90	.90
JU3)told you that you do not need to do more physical activity because you know how to care for your health?	.85	.86	.90
JU4)told you that more physical activity is not necessary for you because you have not had any health problems?	.82	.88	.91
Criticizing Behavior (first-order factor)	**.63**[e]	**.68**[e]	**.70**[e]
CR1)excluded you because of your low ability in a physical activity?	.78	.75	.69
CR2)forced you to do a physical activity which you disliked?	.76	.80	.71
CR3)complained that your skill in a physical activity is not good enough?	.90	.91	.86
CR4)criticized your low skill level in a physical activity?	.92	.91	.93

[a] The questions were asked "During the past 12 months, how often have your family, friends and experts . . ."
[b] Defined as wife/husband, sister/brother, child/grandchild, other relatives, etc.
[c] Defined as close friend, new acquaintance, neighbor, co-worker, club members, etc.
[d] Defined as physician, nurse, physical therapist, exercise/sport instructor, other health-related professionals, practitioners and volunteers, etc.
[e] The loading of the first order factor on the second-order factor

Older Adult Exercise Status Inventory: OA-ESI (O'Brien Cousins, 1996)

Leisure-time physical activity was considered as the criterion variable for these positive and negative social influences. Leisure-time physical activity is defined as the sport and exercise activities undertaken in the individual's discretionary time that lead to a significant increase in the total daily expenditure of energy (Gauvin, Wall & Quinney, 1994). In order to assess the level of leisure-time physical activity for the older adult population, the Leisure Activity section of OA-ESI (O'Brien Cousins, 1996) was used. The OA-ESI is a 7-day recall instrument that improved on the designs of previous seven-day recall instruments by being age-relevant and memory-enhancing. The inventory organizes 38 exercise and sport activities alphabetically by rows, and the 7 days of the week by columns. Subjects fill in the duration of their participation in minutes for specific activities for each day. MET (metabolic) units are also provided on the form so that the researcher can calculate the daily and weekly energy spent on physical activity in kilocalories. So far, the OA-ESI has demonstrated adequate four-week test-retest reproducibility (r=.77) and exhibited concurrent validity with lifelong status in physical activity (r=.45), with frequency of sweating in the past four months (r=.41), and with active days per week (r=.49). Leisure time exercise had significant statistical associations with psychological constructs such as self-efficacy in exercise, social support for physical activity and perceptions about risk in activity settings (O'Brien Cousins, 1996). The average one-week energy expenditures using this measure was 857 kilocalories among the participants of the present study. The two-week test-retest stability with 59 subjects in the present study was r=.86, indicating further support for the reliability of the OA-ESI.

Control variables

Age, gender, socioeconomic status, marital status, and perceived health status have consistently been found to be related to the physical activity of older adults (Shephard, 1994). These variables also appear to be related to the older adults' social support (O'Brien Cousins, 1995). For these reasons, age, gender, education, marital status and perceived health were controlled in all analyses that examined associations between social influences and physical activity. Because socioeconomic status was difficult to assess for older adults, the respondents' level of education was substituted as a control variable. Age and education (total years of completed formal education) were coded continuously, and gender and marital status were scored as discrete variables (1=men, 0=women; 1=married, 0=widowed, divorced, separated or single). Health status was scored from "poor" (1) to "excellent" (4). The two-week test-retest stability of the perceived health status was .860.

Data Analyses

The distribution and reliability of the composite indicators of positive and negative social influence measures were first examined. Next, intercorrelations among control variables, positive social influence variables, and negative social influence variables were analyzed using bivariate correlations. Last, using positive and negative social influence scores as the independent variables and one-week energy expenditure scores obtained by the OA-ESI as the dependent variable, three separate hierarchical multiple regressions were conducted separately in the family, friend and expert categories. Age, gender, education, marital status and health status were entered in the first block; positive social

influences and negative social influences were entered in the second block. After removing the effects of the control variables, standardized regression coefficients of positive and negative social influences were compared in the final equations to examine the relative impact of positive and negative social influences on energy expenditures.

Results

Distribution and Reliability of Positive and Negative Social Influences

Table 4-2 shows the means, standard deviations, internal consistencies and two-week stabilities of positive and negative social influence indicators in each family, friend and expert data set[5]. Among the six means of composite indicators, the three highest means were all positive influence indicators, whereas the three lowest means were all negative social influence indicators. Although these dada did not address the actual frequencies of negative and positive social influences, they suggested that the negative influences rarely occurred compared with positive influences. In terms of three source differences, the closer the relationships, the more often both positive and negative social influences occurred. Family members were rated as the sources who most frequently provided both positive and negative social influences, friends were ranked second, and experts were the least frequent.

For reliability values, all the alpha coefficients of the six indicators exceeded. 80, showing adequate internal consistencies. Test-rest reliabilities ranged from .71 (negative expert influences) to .85 (negative family influences and positive friend influences),

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[5]The descriptive statistics of the each item were presented in Appendix A.

suggesting good stability of these indicators. Overall, the six composite positive and negative indicators indicated good reliability supported by adequate internal consistency and stability.

Table 4-2. Distribution and Reliability of Composite Indicators.

Composite Indicators	Mean[a]	SD	Coefficient alpha[b]	Test-Retest reliability[c]
(Family)				
Positive Influence	.80	.87	.92[d]	.79[d]
Negative Influence	.24	.43	.85[d]	.85[d]
(Friends)				
Positive Influence	.71	.80	.92[d]	.85[d]
Negative Influence	.19	.37	.85[d]	.80[d]
(Experts)				
Positive influences	.62	.82	.92[d]	.79[d]
Negative influences	.19	.41	.87[d]	.71[d]

[a] Range=0-4, [b] N=479, [c] N=59, [d] P<.001

Intercorrelations among Control and Social Influence Variables

In the relationships between control variables and social influence variables (Table 4-3), age had a greater correlation with family positive influence (r=-.15, p<.01) and friend positive influence (r=-.13, p<.01) than with family negative influence (r=.01, n.s.) and friend negative influence (r=.01, n.s.). These findings showed that as subject age increased, the positive social influences of family and friends decreased. However, negative social influences of friends and family were not affected by subject age - older adults received some negative influences regardless of their ages. Higher education level was weakly yet significantly more related to positive social influences (family=.14, p<.01; friend=.11, p<.01) than to negative social influences (family=-.02, n.s.; friend=-.02, n.s.).

With regard to gender, men generally reported more negative social influences than did women. Health status was correlated to both positive and negative social influences in family and friend categories, but with only negative social influences in the expert category (r=-.28, p<.001). As far as marital status was concerned, having a spouse was positively correlated to positive family influences but not related to negative family influences. These findings suggest that the positive and negative social influences are differentially associated with age, gender, education, marital status and health status. Thus, different causal factors of personal attributes may underlie positive and negative social influences.

In the relationships among social influence variables, positive influences among the three sources showed strong correlations (r=.75, .50, and .60, p<.001). High correlations among the three sources were also shown in the negative social influence variables (r=.81, .67., and .78, p<.001). However, the correlations between positive and negative influences were all near 0 across the three sources (ranging from .03 to .05, n.s.). These correlation analyses indicated that it would be valuable to examine the data using positive and negative social influences as independent constructs separately for family, friend and expert data sets.

TABLE 4-3. Correlations Among Control Variables and Social Influence Variables

	1	2	3	4	5	6	7	8	9	10
(Control Variables)										
1. Age										
2. Gender[a]	-.13**									
3. Education	-.18***	-.03								
4. Marital Status	-.28***	.36***	.07							
5. Health Status	-.19***	.08	.18***	.15**						
(Family Influence Variables)										
6. Family Positive Influence	-.15**	-.01	.14**	.17***	.19***					
7. Family Negative Influence	.01	.10*	.02	.02	-.18***	.05				
(Friend Influence Variables)										
8. Friend Positive influence	-.13**	-.01	.11**	.07	.12**	.75***	.01			
9. Friend Negative Influence	.01	.11*	-.02	-.02	-.18***	.01	.81***	.03		
(Expert Influence Variables)										
10. Expert Positive Influence	-.02	-.01	.01	.01	-.05	.50***	.08	.60***	.06	
11. Expert Negative Influence	.03	.11*	-.04	-.03	-.28***	-.06	.67***	-.05	.78***	.04

[a] 1=men, 0=women

[b] 1=married, 0=widowed, divorced, separated or single

*p<.05. **p<.01 ***p<.001

Relative Impact of Positive and Negative Social Influences on Physical Activity

Three separate multiple regression equations predicting activity level are presented for family, friend and expert data sets in Table 4-4. In the first step of each of the regression analyses, the regression equation containing the control variables of age, gender, education, marital status and health status explained 7.9% of the total variance in the dependent variable, $F(5, 469)=7.89$, $p<.001$. The positive and negative social influences were next entered and accounted for an additional 12%, 14% , and 9% of the variance in the dependent variable for family, friends and experts, respectively. The incremental contributions of the positive and negative social influences were all statistically significant across the three sources ($p<.001$).

Standard regression coefficients in the final equations showed that both positive and negative social influences were significantly associated with energy expenditures in all three source categories ($p<.001$). It is noteworthy that the regression coefficients for the positive and negative influences were higher than for any of the five control variables. This means that both the positive and negative influences were found to be stronger predictors for physical activity levels than age, gender, education, marital status and health status. Moreover, the relative effectiveness and disruptiveness of positive and negative social influences on physical activity varied according to the source of these influences. In the family category, the beta coefficients were equal (positive=.25, negative=-.25) in predicting older adult activity level. In the friend categories, the power of positive influences outweighed that of negative influences (.32 vs .-23). In contrast, the negative influences proved to be a stronger predictor than the positive influences in the expert

category (-.24 vs .17). Therefore, when the negative influences were given by health experts or professionals, the detrimental effect of negative social influences on physical activity was more pronounced.

Table 4-4. Relative impact of Positive and Negative Social Influences on Current Physical Activity Involvement.

Predictor variables	Family Beta	Family R^2 Change	Friends Beta	Friends R^2 Change	Experts Beta	Experts R^2 Change
Step 1: Controls						
Age	-.13**		-.12**		-.15***	
Gender	.11*		.11*		.10*	
Education	.07		.05		.08	
Marital Status	-.07		-.05		-.04	
Health Status	.08	.079	.10*	.079	.11*	.079
Step 2: Social Influences						
Positive Influences	.25***		.32***		.17***	
Negative Influences	-.25***	.122	-23***	.143	-.24***	.089

Note. The control variables were entered simultaneously in the first step, R^2=.078, F(5, 469)=7.89, p<.001, and positive and negative social influence scores were entered simultaneously in the second step in each analysis, R^2 change in family=.12, F(2, 467)=33.65, p<.001, R^2 change in friends=.14, F(2, 467)=41.29, p<.001, R^2 change in experts=.09, F(2, 467)=21.89, p<.001. The betas shown are from the final equation obtained from the second step. * p<.05. ** p<.01. *** p<.001

Discussion

This research was designed to simultaneously investigate positive and negative social influences and compare their relative effectiveness and disruptiveness on the physical activity of older adults. First, the positive and negative influences accounted for significant portions of the variances in the dependent variable beyond that accounted for by the control variables, age, gender, education, marital status and health status. Large

regression coefficients ($p<.001$) shown in the analyses for each of these social influence sources demonstrated that negative social influences were as important predictors for the physical activity level of older adults as positive social influences. These findings are not surprising considering the fact that previous studies have demonstrated the strong impact of perceived social barriers on the involvement of physical activity among older adults (e.g., Hayslip, Weigand, Weinberg, Richardson & Jackson, 1996; O'Neill & Reid, 1991). What is surprising, however, is that although negative influences rarely occurred compared with positive influences, the negative influences had an equal or even stronger impact on the current physical activity levels. This finding suggests that one negative action had a greater magnitude than did one positive action. Thus, once the negative influence does occur, it can have a strong intensity and a potent effect on the activity behavior. When the base-rates of the positive and negative influences are adjusted, the adverse effects of the negative social influences on physical activity might further exceed the beneficial effects of the positive influences.

Source-specific analysis demonstrated that the detrimental effects of negative social influences were more pronounced when health professionals provided these influences (beta=-.24 in negative influences : .17 in positive influences). Rook (1984) argued that negative experiences have a greater impact because they are rarer, and therefore, more salient. In addition, humans are considered to exhibit a generally cost-oriented (i.e., risk-avoiding) rather than reward-oriented survival mechanism (Kanouse & Hanson, 1972). If health professionals provide such negative risk information as "physical activity would worsen your health," this information is more likely to pose a serious threat

since health professionals are usually perceived to be credible informants (Godin & Shephard, 1990). The advice of health professionals is especially reinforced by health-threatening events in the individual's later years. In such cases, people are more receptive or vulnerable to such advice (Lewis & Lynch, 1993). The present study suggests that these behaviors of health professionals may sometimes be "disabling support" rather than "enabling support" (Rowe & Kahn, 1987). Health professionals working with the older adult population may need to examine and monitor more carefully the words they choose, as well as their own actions and attitudes toward aging and physical activity.

The present study also demonstrated that positive and negative influences were not inter-related, and that they both significantly and independently predicted the current physical activity levels of older adults. One might suspect that the independence of positive and negative social influences was simply due to the severe skewness of negative social influences items (Finch et al., 1989). However, it should be recognized that the composite indicator of the negative influences had sufficient variability to show significant relations with the dependent variable. The independent determination suggests that there are two distinct processes by which social influences affect the physical activity involvement of older adults: empowering processes through positive influences and disempowering processes through negative influences (McWilliam, Brown, Carmichael & Lehman, 1994).

Because of the dual nature of social influence processes, social influence intervention should be designed from two perspectives. The first model is based on social support interventions that focus on creating, activating, or strengthening supportive

behaviors for the involvement of physical activity. Traditional social interventions in community settings have been placing emphasis on increasing the number of supporters (e.g., family supporters or friend supporters) rather than on the behavioral functions of support (e.g, how to support) (Cutrona, 1990; Vaux, 1992). The proposed three subdimensions that had high loadings on the positive social influence might be useful to understand how we could support older adults to be more active. Thus, companionship, informational and esteem support would be target actions for stimulating social support for the physical activity of older adult populations. The other expanded model should include the preventing, modifying, or eradicating of negative behaviors that hinder physical activity involvement. As indicated in the present study, the negative social influence measures were composed of three subdimensions: inhibitive, justifying and criticizing behaviors. Therefore, in order to diminish the negative social influences, we could target three major actions of people that contain negative message such as "you shouldn't do physical activity," "you don't need to do physical activity," and "you are not good at doing physical activity". However, the current community interventions in physical activity settings have almost entirely concentrated on the first social support model. The findings in the present study argue for a redirection toward more balanced intervention strategies which take into account both the positive and the negative properties of social relationships.

It is important, however, to bear in mind the limitations of the study. First, although the sample of this study was from diverse places in the city area, it was not representative of the overall population, based on random sampling procedures. Extended

care centers and nursing homes were excluded from sampling sites, and among the contacted places 36 sites did not agree to participate in the survey. Therefore, the results and conclusions of this research have reduced generalizability. Second, 202 (29.7%) subjects with missing data on the social influence scale were deleted from the analysis. Even though no significant differences were observed between the dropped and retained samples with regards to their age, gender, self-rated health status and activity level, other possible influences of this nonresponse bias are not known. Third, positive and negative social behaviors affecting the physical activity of older adults are undoubtedly broad and complex. There might have been other important positive and negative influences that were not elicited or were eliminated through the item generation processes. Rook (1997) suggests the importance of equivalency between the positive and negative measurements in the comparison of the two constructs. A recommendation for future research efforts is to seek for the best conceptualization which covers broad positive and negative influences on physical activity in older adults. Finally, the present study employed a cross-sectional design using data obtained on a single occasion. Although a time-sequence assumption was made by measuring previous social influences during the past 12 months and current physical activity over a 7-day period, cause-and-effect relationships could not be established. Some researchers have suggested that the effects of negative influences are longer-lasting compared with those of positive influences, and that these negative effects are more pronounced over a short period. (Finch & Zautra, 1992; Krause, Liang & Yatomi, 1989). Further research utilizing stringent longitudinal research designs is required to explore these issues in physical activity settings. Prospective studies, both

quantitative and qualitative, that monitor positive and negative social influences and their short and long term impact on older adult exercise choices, frequency, duration and intensity are likely to elucidate not just who, but how, when and where older people are socialized to exercise or not.

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Chapter 5
Conclusion

The purpose of this dissertation was to investigate positive and negative social influences on physical activity in the social relationships of older adults. Three studies were organized to systematically approach this investigation. In the first study, the social influence studies in the physical activity sciences were reviewed and the major findings were consolidated. The primary goal of this review was to identify the conceptual and measurement issues pertaining to social influences in the physical activity sciences. The second study was devoted to the development of a multidimensional measure designed to assess both the positive and negative social influences specific to the contexts of physical activity in older adults. Special attention was directed at understanding social influence constructs by means of testing the hypothesized nature of the target construct of the proposed measure. The last study focused on the demonstration of the importance and utility of the simultaneous scrutinizing of positive and negative social influences, and their independent impacts on physical activity levels in older adults. The beneficial effects of positive influences and the detrimental effects of negative influences on physical activity were examined in different sources of these influences.

The remainder of this chapter is structured as follows. In the next section, major research findings are highlighted and their original contributions to exercise gerontology are discussed. This is followed by a section which provides a discussion of the methodological and practical implications of the research findings. These implications highlight a number of issues which warrant further study and refienment. The subsequent

section outlines some of the expected directions and topics for future research while discussing the limitations of the present research.

Major research findings

The first study was conducted to identify a desired research direction for the comprehensive understanding of the social influences in social relationships on the physical activity of older adults. By careful examination of the existing measurement approaches, this review attempted to make explicit the often implicit assumptions of social influence constructs in physical activity studies. A growing body of literature supported the importance of the social influences of social relationships on the physical activity of aging adults. However, most of the research treated social influence as a global entity. This conceptual assumption was manifested in two major ways within the existing assessments of social influences. First, the positive and negative aspects of social influence were considered as polar opposites that represented one positive domain. Consequently, there was no existing measure to assess the negative sides of social relationships in the physical activity settings. Second, some scales used post-hoc summary scales without discussing the nature of the target constructs. For example, many social support studies in community settings assessed a single support category, combined several support types into one index, or used the total number of support sources (e.g., family and friend support). Few studies examined the different components of supportive behaviors for the physical activity of the older adult population. The investigation of the negative social influence taxonomy was not seen within existing physical activity studies. Reflecting these

conceptual and measurement assumptions, social influence interventions tended to focus on creating and strengthening supportive relationships. The review suggested that the development of measurement techniques, gained by exploring various positive and negative social influences specific to the physical activity among older adults, might contribute to a better understanding of the connections between social relationships and physical activity. This comprehensive assessment was expected to lead to the more effective design of social influence interventions for promoting physical activity in older adults.

The second part of the study involved the actual development of a multidimensional measure designed to assess social influences on the physical activity of older adults. This measure was characterized by the following five aspects. First, both the positive and the negative social influences were measured as different social influence dimensions. Second, there were different subdimensions within each of the positive and negative social influence dimensions. Third, behavioral specificity was emphasized to measure what types of supportive and unsupportive actions were being mobilized in social relationships. Fourth, the information regarding the sources of the influences, such as family members, friends and health experts were incorporated in order for an assessment "who" provided the social influences. Finally, the measure was targeted towards the older adult population, and therefore the measurement items were designed to match the contexts of the physical activity of older adults.

The confirmatory factor analyses using 479 survey responses indicated that the positive and the negative social influences were relatively independent, rather than

interdependent on each other. Although positive influences are the logical converse of negative influences, the two constructs were not the opposite ends of a continuum, and they represented different phenomena and experiences. The findings also confirmed that the positive and negative social influences were further divided into subdimensions. Therefore, the positive and negative social influences were found to be not solely unidimensional, but to be consitituted of separate subdimensions.

Interestingly, the data showed that the independence of the positive and negative social influences and the same subdimensional contents were confirmed in three separate analyses of family, friend and expert categories. Therefore, the hypothesized structural nature of social influences on the physical activity was found to be consistent over these three domains of social network members. The findings based on the source analyses suggested two things: 1) family members were not solely supportive nor solely unsupportive, and neither were friends and experts; 2) these different categories of people tended to provide the same kinds of positive and negative influences. The next study investigated these findings one step further. The question was "do family members, friends and health professionals provide these positive and negative social influences with same or different degree of effectiveness ?"

The third study examined the two independent kinds of impacts of social influences on physical activity of older adults: the beneficial effects of positive social influences and the detrimental effects of negative social influences. Contemporary research and theory have suggested a hypothesis concerning the relative impact of positive and negative social influences which is called the social negativity hypothesis (Major, Zubek, Cooper,

Cozzarelli, & Richards 1997). This hypothesis is based on substantial evidence confirming that negative events are weighed more heavily in social judgement, produce more intense reactions, and result in stronger effects on mental health and well-being than do positive events (Rook, 1992; Taylor, 1991). A number of studies have provided evidence consistent with the hypothesis that negative social influences are more strongly related to psychological distress than is social support (Rook, 1984; Vinokur & van Ryn, 1993). The social negativity hypothesis, however, has not been tested in physical activity settings.

Most researchers have examined the social negativity hypothesis in general, that is, without regard to a specific event or context (Major et al., 1997; Rook, 1992). In the current study, the relative impact of the positive and negative social influences were examined by a source-specific approach. The degree of effectiveness or disruptiveness of the positive and negative social influences was assumed to depend upon who was performing the behaviors. So far, only a few studies have investigated this issue and suggested that close interdependent relationships (e.g., family) show stronger detrimental effects of negative social relationships on the mental health and well-being than less close relationships such as friends (Major et al., 1997). However, the source coverage of these studies has been limited only to informal network members, such as family members and friends. The last study in the dissertation included not only these informal networks but also formal networks, such as health professionals and experts.

The statistical analyses showed that although negative influences rarely occurred compared with positive influences, negative influences were as important predictors for the physical activity level of older adults as positive social influences. Moreover, as

hypothesized, the relative impact of positive and negative social influence on physical activity varied according to the sources of the social relationships within which they occurred. The positive and negative social influences on the physical activity level had comparable effects when these influences were provided by family members. The beneficial effects of positive influences exceeded the detrimental effects of negative influences when their sources were friends. In contrast, the detrimental effect of the negative social influences exceeded the beneficial effects of the positive social influences when these were provided by health professionals. These findings indicated that negative social influences were more likely to jeopardize the involvement of physical activity when it occurred in the context of formal relationships, such as with health professionals.

Implications

The consistency of the results across social support studies has fostered an emerging consensus regarding the benefits of social relationships. Although these studies are very promising, the current enthusiasm for the concept of social support threatens to obscure recognition that social relationships entail costs as well as benefits. The investigation of the detrimental aspects of relationships has been overshadowed by research on the beneficial aspects of relationships. Consequently, the almost exclusive focus on the positive qualities of social relationships has limited the inquiry to several topics that would broaden the understanding of social relationships' links to physical activity. A complete understanding of the role of social relationships in the involvement of physical activity requires the simultaneous consideration of both the positive and the

negative aspects of social relationships in future research.

In addition, current measurement approaches have been restriced to social support constructs. However, knowledge of the extent to which an older person's social relationships provide social support tells us little about the extent to which the social relationships may also generate negative actions. This can be ascertained only by directly assessing the older person's negative as well as positive qualities in social relationships.

In a similar vein, the assessment of social influences should distinguish the presence of positive social influences from the absence of negative social influences (and vice versa). Whereas nonsupportive interactions simply fail to provide positive input, unsupportive interactions contribute negative input. Therefore, if a scale measures these two constructs as the polar opposites of the same continuum (e.g, "helpful/unhelpful," "supportive/unsupportive," or "encourage/discourage"), or if the negative items are reverse scored and combined with the positive items, the unique information of both the positive and negative social influences would be lost. Moreover, the present research indicates that encouraging and discouraging actions can take place within the specific domain of social relationships, such as family members, friends and health professions. Therefore, even when social influences are assessed with regard to these specific network member domains, the dual assessment of positive and negative influences is desirable at each source category.

The separate and strong effects of the positive and negative social influences on the physical activity of older adults inform us of two possible types of intervention strategies that would have strong impact on the physical activity levels of older adults.

The first type is the positive-focused interventions which are mainly represented by traditional social support interventions. The goal of the interventions is to maximize supportive actions for physical activity, including companionship, informational and esteem support. The other type is the negativity-focused interventions. The goal of these interventions is to minimize the unsupportive actions for physical activity, such as inhibitive, justifying and criticizing behaviors. Previous social influence interventions have heavily relied on the first type of interventions, because the inactive population has been regarded as a target group who needs to receive more supportive actions from others. However, the negativity-focused interventions may be also effective, because the inactive population can also be regarded as a target group who needs to be released from various behaviors which discourage their physical activity. To date, such negativity-focused social interventions have been overlooked due to the conceptual assumption that positive and negative social influences are the opposite ends of a continuum. In this conceptual paradigm, the promotion of positive social influences has been unconsciously believed to automatically decrease negative social influences. However, as the current findings indicate, negative social influences independently occur in the older adults' social world and have an independent effect on their physical activity levels. Therefore, neglecting the negative aspects of social relationships would hinder our efforts to effectively promote the physical activity of older adult populations. Shifting from a preoccupation with the beneficial effects of social influences to a more balanced perspective considering both the beneficial and the detrimental effects of social influences would help us to develop more comprehensive and effective intervention strategies.

More specifically, our intervention efforts should be directed not only toward increasing the number of supporters for the physical activity but also decreasing the number of inhibitors for the physical activity of older adults. This research suggests that family, friend and health professional networks can be composed by both supporters and inhibitors. Therefore, it may be unwise to make an assumption about the quality of a social relationship based on the knowledge of the role relation. Family members, friends and health experts may not be uniformly helpful resources for promoting the physical activity of older adults. Although social influences were viewed as negative if they were presumed to discourage the involvement of physical activity in this research, ample evidence indicates that people unintentionally inhibit or undermine the health practices in a variety of ways (Kaplan & Toshima, 1990; Suls, 1982), such as by inadvertently interfering with prescribed medical regimens, modeling unhealthy behaviors, or being over-protective after a serious illness or injury. Despite their unfortunate consequences, such actions are not always recognized or viewed as negative actions by the individuals involved. Therefore, interventions should be expanded to include efforts to develop people's sensitivity toward their actions and statements regarding the physical activity of older adults.

In the first place, it might be important to make invisible negative behavior visible by the dissemination of detailed information about what actions or comments have a detrimental impact on the physical activity of older adults. Ironically, the current research suggested that health professionals had greater potential to act as inhibitors of the physical activity of older adults compared with family members and friends. The power of negative

social influences would be more pronounced if the influencers have authoritative roles (Vinokur & van Ryn, 1993). Health professionals who work with older adults should be alerted that their actions or statements may easily jeopardize the older adults' involvement in physical activity. Exercise scientists should expand their professional networks and create the opportunity to give other professionals useful information about physical activity promotion for older adults.

The intervention target can also be directed to older adults themselves. Older adults should be empowered by enlightening them convincing how they elicit or evaluate negative influences triggered by others. In the social support intervention framework, older adults have always been encouraged to receive more support or seek support sources for their involvement in physical activity. An alternative approach is to increase the older adults' power of resistance to negative social influences and effectively to cope with these negative influences. This intervention might involve assisting individuals to discriminate positive and negative social influences, and to become more skilled at minimizing the effect of unsupportive actions from others. This effort is especially important for older adults who must rely on few support resources. If negative social influences occur within a social network, individuals with a limited social support network may be less able to find help to cope with the negative influences. Therefore, rather than focusing only on supportive sources, public health interventions should encourage and enable older adults to discriminate potential negative sources and overcome these negativities.

There are broad implications from viewing negative social influences as

independent detrimental indicators in physical activity. Yet, it is important not to exaggerate the impact of the negative social influences that people encounter. Thus, despite mounting evidence that negative social influences can cause unhealthy behaviors, it would be unfortunate to "pathologize" social relationships. Indeed, the present research found that in terms of their prevalence older adults' social relationships were characterized more by positive social influences than negative social influences. Anchoring the social support interventions may increase our effectiveness in designing interventions to help those whose social relationships are deficient in some way. This study advocates the importance of a more balanced view of social relationships, so that practitioners will be better prepared to maximize the benefits of social influence interventions. A balanced perspective on social relationships requires the acknowledgment of the enormous beneficial effects that are produced by supportive actions from others, as well as the recognition of the possible detrimental effects that are caused by unsupportive actions from others. The identification of the detrimental effects of social relationships in this study should not be considered as casting doubt on the efficacy of prevalent social support interventions. Rather, it suggests as a future possibility that the dual intervention approach of positive and negative social influences would effectively promote the physical activity of older adults who are not currently blessed with a favorable social world for enjoying an active lifestyle.

Recommendations for future research

The social relationships in later life, as in other life stages, provide a complex mix

of supportive and unsupportive experiences. Until recently, researchers have focused primarily on the positive aspects of older adults' social relationships, while overlooking the negative aspects. Clearly, more work is needed to understand how various social influences affect older adults' physical activity. An extensive agenda for future research on negative social influences may be derived by posing parallel versions of the questions that have already been raised by social support researchers. For example, many questions still remain about the distinctive effects of different kinds of negative social influences, the specific processes that underlie the adverse effects of negative social influences, and the implications for interventions that stem from the research on negative social influences. Methodological issues that must be addressed in the studies on negative social influences also have parallels in the literature on social support, including the reliability and validity of self-reports of negative influences, the need to control for the effects of factors that may be confounded with negative influences, and the use of research designs that permit legitimate inferences about causal associations. This section concludes by highlighting some topics which deserve future studies.

First, future research works should include efforts to explain why negative social influences appear to have substantial effects on physical activity. For example, if future research indicates that the effects of rare negative social influences often overshadow the effects of positive social influences, how should such asymmetries best be explained? Kanouse and Hanson (1972) argued that humans may have an innate tendency to be more vigilant toward potential threats or risks than toward potential pleasures or benefits. Berscheid (1983) commented in this regard that the human "emotional system appears to

be a 'trouble-shooting' system" (p.145). Another possibility is that unsupportive behaviors change an individual's view of self and others (Lakey, Tardiff & Drew, 1994). For example, excessive criticism may lead persons to view themselves more negatively, perceive less control over their lives, draw dysfunctional conclusions about the social world. In addition, inhibitive behaviors may hinder goal-directed activity, erode perceived self-efficacy, disrupt problem-solving, or interfere with the use of social support resources (Ruehlman & Karoly, 1991). No empirical tests of these explanations have been undertaken in the physical activity sciences; such tests accordingly represent a major topic for further work.

Second, determining what causes some people to experience a great deal of negative social influences represents a high priority for future research, just as the question of what causes some people to experience much social support has begun to be widely investigated. Only a few published studies have provided detailed information about factors that affect one's exposure to negative social influences in gerontology. Most studies were not designed explicitly to examine the antecedents of negative social influences. In the present study, some individual differences in the exposure to positive and negative social influences were found. The data showed that age, education, family status were more related to positive influences than negative influences. This suggests that the factors that cause negative social influences may not be identical to those that cause positive social influences. Thus, different dynamics may underlie positive and negative social influences, requiring separate analyses of the predisposing factors of each in the physical activity sciences. A great deal remains to be learned about the factors that affect

older adults' exposure to negative social influences.

Apart from differences in their sheer exposure to negative social influences, it is likely that the relative impact of positive and negative social influences vary depending on the context and personal variables. In the social sciences, researchers recognize that many phenomena cannot be adequately understood or investigated without considering the contextual factors that influence them. Social influence is best viewed as a complex process unfolding in an ecological context. As positive and negative social influences are described in more complex and multidimensional terms, confusion may arise regarding their dimensions versus their contexts. However, the contexts of social influences should be distinguished from the contents of social influences. Contextual factors facilitate or impede the effectiveness or disruptiveness of positive and negative social influences. Social support literature has focused on identifying the specific conditions under which social support is stimulated and maximized. For example, Sarason, Pierce and Sarason (1990) have presented the "triadic hypothesis" which focuses on three contextual variables of support: personal characteristics, interpersonal relationships, and the situations (e.g., life events) that stimulate the effectiveness of supportive behaviors. In this hypothesis, social support is defined as a product of interactions among these contextual variables. This contextual approach should also be taken into consideration in studies on negative social influences. For example, identifying the specific conditions under which negative social influences are stimulated and maximized is crucial to our understanding how we can prevent or minimize these negative influences. The present research focused only on the sources of social influences as contextual variables. The data suggested that the

disruptiveness of negative social influences exceeded the beneficial effects of positive social influences when these influences were exerted by health professionals. However, older adults themselves may differ in how strongly they react to negative social influences, or other contextual variables may have strongly altered the negative effects. What are the specific conditions under which the detrimental effects of negative social influences are pronounced? We should have a better understanding of the ways or conditions in which we can help prevent or minimize their impact.

Methodologically, a longitudinal study is highly desired because it can permit statistical control for the respondents' initial levels of physical activity. Although the hypotheses in this research assumed that positive and negative social influence would shape physical activity levels rather than vice versa, the inferences about causation were limited by the correlational design of the study. Another methodological limitation of this study is that all of the measures were self-reported, increasing the possibility of inflated correlations among the measures. The confidence in the conclusions of this study would have been strengthened if the actual supportive and unsupportive interactions had been assessed for social network members. Data on social influences may be gathered from all network members (total network data), from partial network members (partial network data), or from a single focal person (egocentric network data). In the physical activity sciences, social support has been assessed only by the use of egocentric data. Therefore, it is necessary for researchers to go beyond the conventional reliance on the self-reports of social recipients in order to develop designs that include network members in data collection efforts. Social influences are both given and received. Through the

interpersonal communication approach, future work should take an important step to explore the dynamic processes of both positive and negative social influences.

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Appendix A: Descriptive Statistics of Positive and Negative Social Influence Items

Question Item	*Mean[a](SD)* *Family*	*Friend*	*Expert*
Positive Social Influence People's comments or actions which encourage involvement in physical activity			
Companionship Support: partnership assistance that suggests "We participate together"			
C1)made plans with you for doing a physical activity together?	.7 (1.2)	.7 (1.2)	.3 (.9)
C2)teamed up with you to engage in a physical activity together?	.8 (1.3)	.9 (1.4)	.4 (1.0)
C3)promised you that they would participate in a physical activity with you?	.6 (1.2)	.7 (1.2)	.2 (.8)
C4)given you helpful reminders to do a physical activity together with them?	.5 (1.1)	.6 (1.1)	.3 (1.0)
C5) changed their schedules so you could do a physical activity together with them?	.4 (1.0)	.3 (.9)	.1 (.5)
Informational Support: Knowledge assistance that suggests "You should know"			
I1)informed you about the expected positive effects of a physical activity on your health?	.9 (1.3)	.7 (1.3)	1.0 (1.1)
I2)explained to you why a physical activity is important to improve your health?	.9 (1.2)	.6 (1.1)	1.0 (1.4)
I3)clarified for you how you may achieve your health goals through a physical activity?	.4 (.9)	.4 (.8)	.8 (1.3)
I4)suggested a physical activity program or facility which might assist your health?	.5 (1.0)	.5 (.9)	.8 (1.3)
I5)explained to you about the amount or intensity of physical activity necessary for improving your health?	.5 (1.0)	.4 (.8)	.8 (1.3)
Esteem Support: Esteem information provision that suggests "You are good"			
E1)complimented you on the mastery of a physical activity skill?	1.0 (1.4)	.9 (1.3)	.7 (1.3)
E2)praised you that your physical activity level is superior to that of other people your age?	1.3 (1.5)	1.1 (1.5)	.7 (1.3)
E3)affirmed that you have done well in your physical activity?	1.1 (1.5)	.9 (1.3)	.7 (1.3)
E4)shown their respect for your versatility in physical activity?	1.2 (1.5)	.9 (1.4)	.7 (1.3)
E5)told that you should be proud of your physical activity skills?	1.2 (1.5)	1.0 (1.4)	.8 (1.3)
Negative Social Influence People's comments or actions which discourage involvement in physical activity			
Inhibitive Behavior: disapproval and discouraging behaviors that suggest "You should not do physical activity"			
IN1)warned you that starting a physical activity would worsen your health?	.3 (.8)	.3 (.7)	.3 (.9)
IN2)advised you to avoid a physical activity in order to avoid injury or ill health?	.3 (.9)	.3 (.8)	.4 (.9)
IN3)told you that you should keep away from a physical activity in order not to have falls or accidents?	.2 (.7)	.3 (.8)	.3 (.7)
IN4)forbidden you to engage in a physical activity because of the potential health risk?	.2 (.7)	.2 (.6)	.3 (.8)
Justifying Behavior: excusing and overprotective behaviors that suggest "You don t need to do physical activity"			
JU1)told you that more physical activity is not necessary for you because you are already busy in your other daily routines?	.3 (.8)	.3 (.8)	.2 (.6)
JU2)told you that you do not need to do more physical activity because you are healthy enough?	.2 (.7)	.2 (.6)	.1 (.5)
JU3)told you that you do not need to do more physical activity because you know how to care for your health?	.2 (.7)	.2 (.7)	.2 (.7)
JU4)told you that more physical activity is not necessary for you because you have not had any health problems?	.2 (.6)	.2 (.7)	.1 (.6)
Criticizing Behavior: demanding and blaming behaviors that suggest "You are not good at doing physical activity"			
CR1)excluded you because of your low ability in a physical activity?	.3 (.8)	.2 (.7)	.2 (.7)
CR2)forced you to do a physical activity which you disliked?	.1 (.8)	.1 (.5)	.1 (.4)
CR3)complained that your skill in a physical activity is not good enough?	.2 (.7)	.1 (.5)	.1 (.5)
CR4)criticized your low skill level in a physical activity?	.2 (.7)	.1 (.5)	.1 (.5)

[a] Range = 0 (never) to 4 (very often)

Appendix B
Agency-Informed Consent

Positive and Negative Social Influences in Physical Activities of Older Adults

June 15, 1997

Principal Investigator:
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Phone (home): 433-3580

Co-investigator:
Sandra O'Brien Cousins, Ed.D.
Professor
The Faculty of Physical Education and Recreation
The University of Alberta
Edmonton, Alberta T6G 2H9
Phone (office): 492-1033

Dear Mr. or Ms. Smith:

We are currently investigating how older adults should be given support and encouragement by their communities to have a more active, healthy and independent life-style. This is becoming a more and more important topic in our lives. Not only professionals but also family members and other community people want to support physical activity among older adults and need to know about what kinds of actions encourage or discourage involvement in physical activity among older adults.

We would like your help in identifying how communities can assist older adults in becoming involved in exercise and recreation. With your help, we can gain a better understanding of how older adults could be supported to be more active. This may assist us in effectively developing future community programs to encourage healthy lifestyle in the later years of life.

In order to gain the necessary information, we are conducting a survey involving up to 850 adults who are over 55 years old in Edmonton. Prospective eighty-seven senior citizen centres and senior groups, which were identified from the directories given by the Society for the Retired and Semi-Retired, are currently being contacted. Among those

contacted is your centre/group. We are hoping that about 15 adults who are over 55 years old in your centre/group would be willing to spend about 30 minutes filling out a questionnaire.

We would appreciate your endorsement and support for this project. For example, there may be a contact person who could help us to arrange to meet with a group or groups of older adults at, or prior to, their normal program times. The procedure would require that we bring the questionnaires to your site at an appointed time and supervise the individuals filling them out.

This research is based on the assistance of volunteers. Therefore, subjects will choose for themselves whether or not to participate. Their responses are strictly confidential, and no one other than the principal investigator and co-investigator will have access to the information they provide. Anonymity will be ensured for all subjects and your site. All data will be kept in a locked file cabinet to safeguard the confidentiality and anonymity of the subjects and sites. All publications resulting from this research will safeguard the confidentiality and anonymity of the research subjects and sites.

Being in this study is voluntary. You are free to decide if you want to help in this research. If you are interested in participating, please sign the subject consent form. Then mail it back to me in the addressed stamped Special Letter envelope.

Permission to conduct the survey has been granted by the Ethics Committee of the Faculty of Physical Education and Recreation at the University of Alberta. If you have any questions or concerns about the survey, please contact Makoto Chogahara (433-3580) or Sandra O'Brien Cousins (492-1033)

Thank you for your time and consideration.

Sincerely,

Makoto Chogahara

Appendix C
Agency-Consent Form

Title: Positive and Negative Social Influences on Physical Activity of Older Adults

Investigators:

Makoto Chogahara, MSc. Phone (home) 433-3580
Sandra O'Brien Cousins, Ed.D. Phone (office) 492-1033

I, _____ (Please print your name) agree to participate in a research project directed by Makoto Chogahara and Dr. Sandra O'Brien Cousins from the University of Alberta to investigate the positive and negative social influences on physical activity of older adults. In doing so, I understand all of the following statements:

1. I may approach the investigators at any time if I have questions or concerns regarding any aspect of the study.

2. The individual result each subject provides will only seen by the investigators, and the subject's and centre's (or group's) anonymity is assured at all times.

I approve of the survey being conducted in this centre/group, acknowledging that individuals will choose for themselves whether or not to participate.

Signature _____ **Date** _____

Position _____

Centre/group _____ **Phone** _____

(Please use the self-addressed stamped envelope we have enclosed).

Appendix D
Subject Informed Consent

Survey of Social Influences on the Physical Activity of Adults Over 55

Principal Investigator:
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Co-investigator:
Sandra O'Brien Cousins, Ed.D.
Professor
The Faculty of Physical Education and Recreation
The University of Alberta
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Phone (office): 492-1033

Introduction:

This questionnaire is about other people's actions or statements on your physical activity. It does NOT matter whether or not you are physically active or if you are healthy. We would like your help in identifying what kinds of actions of other people encourage or discourage your involvement in physical activity at this point in your life. With your help, we can gain a better understanding of how older adults should be supported to be more active and healthy. This may assist us in developing future community programs to help encourage healthy lifestyles in the later years of the life.

Procedures:

It takes about 30 minutes to complete this survey. All information will be coded with numbers and kept strictly confidential. You do not have to answer any questions that are difficult for you - however, it would help us if you would jot down your reason for not answering. This questionnaire is more valuable to us if it is as complete as possible.

If you are interested in participating, please sign the attached consent form and then start filling out the questionnaire.

Appendix F
Subject Consent From

I realize that I will be participating in a research project which requires that I provide certain personal data. I agree to allow this data to be used by researchers for the purpose of analysis or publication realizing that the information about me will be held in the strictest confidence and that my identity will never be revealed. My anonymity is assured because the data will be coded by an identification number.

Participants' Signature	Date
Investigator's Signature	Date

Appendix G
Questionnaire

Question 1: AGE AND GENDER

I was born in the year ( ).
I am ( ) male ( ) female.

Question 2: BIRTHPLACE

Were you born in Canada?
( ) Yes
( ) No----In what country were you born? ( )

Question 3: EDUCATION

How many total years of formal education have you completed? _____ years

Question 4: MARITAL STATUS

( ) Married or living common-law
( ) Widowed
( ) Divorced
( ) Separated
( ) Single (never married)

Question 5: RETIREMENT

Have you permanently stopped working full-time for pay or profit?

( ) Yes ( ) No ( ) Dont know

Question 6: WEIGHT

What is your estimated body weight today?

( ) POUNDS OR ( ) kilograms

Question 7: HEALTH

In general, how would you describe your current state of health?

( ) poor ( ) fair ( ) good ( ) excellent

Question 8: ACTIVITY

Compared to other people your age, would you say that you are physically . . .

( ) more active ( ) as active ( ) less active

PLEASE READ INTRODUCTION AND EXAMPLE FIRST

Question 9: (INTRODUCTION)

In this section, we would like to ask you about what peoples comments or actions would make you

. . . feel bad about doing a physical activity

OR . . . not want to do a physical activity

These questions are about:

-- the past **12 months only** (from October 1996 to the current month)

-- it does **NOT** matter how active or inactive you have been during this period.

1) **Physical activity:** any bodily movement during your leisure time, such as swimming, dancing, golf, walking, bowling, bicycling, hiking, or any other sport and exercise activities
2) **Family:** wife/husband, sister/brother, child/grandchild, other relatives, etc.
3) **Friends:**close friends, neighbors, co-workers, or club members, etc.
4) **Experts:**physician, nurse, social worker, other health/exercise professionals, staff or volunteers in public or private agencies.

EXAMPLE

Question:
During the past 12 months, how often have your family, friends and experts . . .

		Never				Very often
		0--------1--------2-------3--------4				
1) warned you that starting a physical activity would worsen your health?	FAMILY.....	(X)	( )	( )	( )	( )
	FRIENDS....	( )	( )	(X)	( )	( )
	EXPERTS...	( )	( )	( )	( )	(X)

ATTENTION!!

For each question, please make **THREE MARKS:(X) once for FAMILY, once for FRIENDS, and once for EXPERTS. Please answer all questions.**

Please start answering questions now.

(QUESTIONS)
During the past 12 months, how often have your family, friends and experts . . .

		Never 0	1	2	3	Very often 4
1) warned you that starting a physical activity would worsen your health?	FAMILY.....	( )	( )	( )	( )	( )
	FRIENDS....	( )	( )	( )	( )	( )
	EXPERTS...	( )	( )	( )	( )	( )
2) advised you to avoid a physical activity in order to avoid injury or ill health?	FAMILY.....	( )	( )	( )	( )	( )
	FRIENDS....	( )	( )	( )	( )	( )
	EXPERTS...	( )	( )	( )	( )	( )
3) told you that more physical activity is not necessary for you because you are already busy in your other daily routines?	FAMILY.....	( )	( )	( )	( )	( )
	FRIENDS.....	( )	( )	( )	( )	( )
	EXPERTS....	( )	( )	( )	( )	( )
4) told you that you do not need do more physical activity because you are healthy enough?	FAMILY.....	( )	( )	( )	( )	( )
	FRIENDS.....	( )	( )	( )	( )	( )
	EXPERTS....	( )	( )	( )	( )	( )
5) told you that you do not need do more physical activity because you know how to care for your health?	FAMILY.....	( )	( )	( )	( )	( )
	FRIENDS.....	( )	( )	( )	( )	( )
	EXPERTS....	( )	( )	( )	( )	( )
6) told you that you should keep away from a physical activity in order not to have falls or accidents?	FAMILY.....	( )	( )	( )	( )	( )
	FRIENDS....	( )	( )	( )	( )	( )
	EXPERTS...	( )	( )	( )	( )	( )
7) excluded you because of your low ability in a physical activity?	FAMILY.....	( )	( )	( )	( )	( )
	FRIENDS....	( )	( )	( )	( )	( )
	EXPERTS...	( )	( )	( )	( )	( )
8) told you that more physical activity is not necessary for you because you have not had any health problems?	FAMILY.....	( )	( )	( )	( )	( )
	FRIENDS.....	( )	( )	( )	( )	( )
	EXPERTS....	( )	( )	( )	( )	( )
9) forbidden you to engage in a physical activity because of the potential health risk?	FAMILY.....	( )	( )	( )	( )	( )
	FRIENDS....	( )	( )	( )	( )	( )
	EXPERTS...	( )	( )	( )	( )	( )

During the past 12 months, how often have your family, friends and experts . . .

	Never 0	1	2	3	Very often 4
10) forced you to do a physical activity which you disliked?					
FAMILY.....	( )	( )	( )	( )	( )
FRIENDS....	( )	( )	( )	( )	( )
EXPERTS...	( )	( )	( )	( )	( )
11) complained that your skill in a physical activity is not good enough?					
FAMILY.....	( )	( )	( )	( )	( )
FRIENDS....	( )	( )	( )	( )	( )
EXPERTS...	( )	( )	( )	( )	( )
12) set your goal for a physical activity without discussing it with you ?					
FAMILY.....	( )	( )	( )	( )	( )
FRIENDS....	( )	( )	( )	( )	( )
EXPERTS...	( )	( )	( )	( )	( )
13) disapproved of your idea of resuming a physical activity because you are too frail or ill?					
FAMILY.....	( )	( )	( )	( )	( )
FRIENDS....	( )	( )	( )	( )	( )
EXPERTS...	( )	( )	( )	( )	( )
14) told you that more physical activity is not necessary for you because you have already worked enough during your life?					
FAMILY.....	( )	( )	( )	( )	( )
FRIENDS.....	( )	( )	( )	( )	( )
EXPERTS....	( )	( )	( )	( )	( )
15) criticized your low skill level in a physical activity?					
FAMILY.....	( )	( )	( )	( )	( )
FRIENDS....	( )	( )	( )	( )	( )
EXPERTS...	( )	( )	( )	( )	( )

QUESTION 10:(INTRODUCTION)

In this section, we would like to ask you about what peoples comments or actions would make you

. . . feel good about doing a physical activity

OR . . . want to do a physical activity

This sections questions are about:

-- the past **12 months only** (from October 1996 to the current month)

-- it does **NOT** matter how active or inactive you have been during this period.

EXAMPLE

Question:
During the past 12 months, how often have your family, friends and experts . . .

		Never 0	1	2	3	Very often 4
1) informed you about the expected positive effects of a physical activity on your health?	FAMILY.....	( )	(X)	( )	( )	( )
	FRIENDS....	( )	( )	( )	(X)	( )
	EXPERTS...	(X)	( )	( )	( )	( )

Please start answering questions.

During the past 12 months, how often have your family, friends and experts . . .

		Never 0	1	2	3	Very often 4
1) informed you about the expected positive effects of a physical activity on your health?	FAMILY....	( )	( )	( )	( )	( )
	FRIENDS....	( )	( )	( )	( )	( )
	EXPERTS...	( )	( )	( )	( )	( )
2) made plans with you for doing a physical activity together?	FAMILY.....	( )	( )	( )	( )	( )
	FRIENDS....	( )	( )	( )	( )	( )
	EXPERTS...	( )	( )	( )	( )	( )
3) explained to you why a physical activity is important to improve your health?	FAMILY.....	( )	( )	( )	( )	( )
	FRIENDS....	( )	( )	( )	( )	( )
	EXPERTS...	( )	( )	( )	( )	( )
4) clarified for you how you may achieve your health goals through a physical activity?	FAMILY.....	( )	( )	( )	( )	( )
	FRIENDS....	( )	( )	( )	( )	( )
	EXPERTS...	( )	( )	( )	( )	( )
5) complimented you on the mastery of a physical activity skill?	FAMILY.....	( )	( )	( )	( )	( )
	FRIENDS....	( )	( )	( )	( )	( )
	EXPERTS...	( )	( )	( )	( )	( )
6) suggested a physical activity program or facility which might assist your health?	FAMILY.....	( )	( )	( )	( )	( )
	FRIENDS....	( )	( )	( )	( )	( )
	EXPERTS...	( )	( )	( )	( )	( )
7) teamed up with you to engage in a physical activity together?	FAMILY.....	( )	( )	( )	( )	( )
	FRIENDS....	( )	( )	( )	( )	( )
	EXPERTS...	( )	( )	( )	( )	( )

During the past 12 months, how often have your family, friends and experts . . .

		Never 0	1	2	3	Very often 4
8) praised you that your physical activity level is superior to that of other people your age?	FAMILY.....	( )	( )	( )	( )	( )
	FRIENDS....	( )	( )	( )	( )	( )
	EXPERTS...	( )	( )	( )	( )	( )
9) promised you that they would participate in a physical activity with you?	FAMILY.....	( )	( )	( )	( )	( )
	FRIENDS....	( )	( )	( )	( )	( )
	EXPERTS...	( )	( )	( )	( )	( )
10) given you helpful reminders to do a physical activity together with them?	FAMILY.....	( )	( )	( )	( )	( )
	FRIENDS....	( )	( )	( )	( )	( )
	EXPERTS...	( )	( )	( )	( )	( )
11) changed their schedules so you could do a physical activity together with them?	FAMILY.....	( )	( )	( )	( )	( )
	FRIENDS....	( )	( )	( )	( )	( )
	EXPERTS...	( )	( )	( )	( )	( )
12) affirmed that you have done well in your physical activity?	FAMILY.....	( )	( )	( )	( )	( )
	FRIENDS....	( )	( )	( )	( )	( )
	EXPERTS...	( )	( )	( )	( )	( )
13) shown their respect for your versatility in physical activity?	FAMILY.....	( )	( )	( )	( )	( )
	FRIENDS....	( )	( )	( )	( )	( )
	EXPERTS...	( )	( )	( )	( )	( )
14) explained to you about the amount or intensity of physical activity necessary for improving your health?	FAMILY.....	( )	( )	( )	( )	( )
	FRIENDS....	( )	( )	( )	( )	( )
	EXPERTS...	( )	( )	( )	( )	( )
15) told that you should be proud of your physical activity skills?	FAMILY.....	( )	( )	( )	( )	( )
	FRIENDS....	( )	( )	( )	( )	( )
	EXPERTS...	( )	( )	( )	( )	( )

Question 11:
How often has your family talked about physical activity with you in the last 12 months?
Circle one number that comes closest to how you think.

Never Very often
0 ----------1 ----------2 ----------3 ----------4

Question 12:
How often have your friends talked about physical activity with you in the last 12 months?

Never Very often
0 ----------1 ----------2 ----------3 ----------4

Question 13:
How often have experts talked about physical activity with you in the last 12 months?

Never Very often
0 ----------1 ----------2 ----------3 ----------4

Question 14:
To what extent do you feel that you have been encouraged or supported in doing physical activity by your family in the last 12 months? Circle one number.

Not at all Extremely
0 ----------1 ----------2 ----------3 ----------4

Question 15:
To what extent do you feel that you have been encouraged or supported in doing physical activity by your friends in the last 12 months?

Not at all Extremely
0 ----------1 ----------2 ----------3 ----------4

Question 16:
To what extent do you feel that you have been encouraged or supported in doing physical activity by experts in the last 12 months?

Not at all Extremely
0 ----------1 ----------2 ----------3 ----------4

Question 17:
How many family members, friends and experts have encouraged or supported you in doing a physical activity in the last 12 months?

Please write the total number of people------ ( )
( ) No one

Question 18:
How many family members, friends and experts have discouraged or not supported you in doing a physical activity in the last 12 months?

Please write the total number of people------ ( )
( ) No one

Question 19: How many close family members and relatives do you have in Edmonton? (people that you can talk to about your private matters, and can call on for help)

( ) family members

Question 20: How many close friends do you have in Edmonton? (people that you can talk to about your private matters, and can call on for help)

( ) friends

Question 21: Please check **one** statement that best represents your current physical activity involvement during your leisure time.

Regular* physical activity is defined as participating in any bodily movement during your leisure time, such as golf, dancing, bowling, hiking, walking, bicycling, swimming, or any other sport and exercise activities, three times or more per week for at least twenty minutes each time.

( ) I currently do not engage in physical activity and I am not thinking about starting in the next six months.
( ) I currently do not engage in physical activity but I am thinking about starting in the next six months.
( ) I currently do engage in some physical activity but not on a regular* basis.
( ) I currently do engage in regular* physical activity, but I have only begun to do so within the last six months.
( ) I currently do engage in regular* physical activity, and I have done so for longer than six months.

Question 22: Please put an X in the space for each month in which you participated in physical activity 9 times or more during your leisure time.

( ) October, 1996	( ) February, 1997	( ) June, 1997
( ) November	( ) March	( ) July
( ) December	( ) April	( ) August
( ) January, 1997	( ) May	( ) September
		( ) October

Question 23: How would you describe your physical activity during your leisure time over your entire life? **Please check only one.**

( ) **Never** been much involved with physical activity
( ) **Previously** active, but not anymore
( ) Active **just recently**
( ) **Intermittently** active
( ) **Always** been involved in physical fitness activity

This is the Last Question Section!!

Question 24:

How much time in <u>minutes</u> did you spend on these activities during the past week(approximately)? Add your own activities at the end if they are not listed here. Leave it blank if you have not done the activity in the past week.

	Time spent in **minutes** on each occasion						
	Mon	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**	**Sun**
Example:	*30*	___	*40*	___	*100*	*10*	___
Aerobic Fitness Class	___	___	___	___	___	___	___
Aquacize Class	___	___	___	___	___	___	___
Badminton	___	___	___	___	___	___	___
Bicycling outdoors (sweaty)	___	___	___	___	___	___	___
Bicycling outdoors (light)	___	___	___	___	___	___	___
Bicycling indoors (sweaty)	___	___	___	___	___	___	___
Bicycling indoors (light)	___	___	___	___	___	___	___
Bowling (5 Pin)	___	___	___	___	___	___	___
Bowling (Lawn)	___	___	___	___	___	___	___
Bowling (Carpet)	___	___	___	___	___	___	___
Calisthenics	___	___	___	___	___	___	___
Canoeing or Kayaking	___	___	___	___	___	___	___
Curling	___	___	___	___	___	___	___
Dancing (Square, Tap, Folk)	___	___	___	___	___	___	___
Dancing (Ballroom, Ballet)	___	___	___	___	___	___	___
Dancing (Line, Hawaiian)	___	___	___	___	___	___	___
Darts	___	___	___	___	___	___	___
Golf	___	___	___	___	___	___	___
Gymnastics, Rhythmics	___	___	___	___	___	___	___
Hiking hilly terrain	___	___	___	___	___	___	___
Horseshoes	___	___	___	___	___	___	___
Jogging (warmth inducing)	___	___	___	___	___	___	___
Jogging (sweat inducing)	___	___	___	___	___	___	___
Rebounding (mini-trampoline)	___	___	___	___	___	___	___

	Time spent in **minutes** on each occasion						
	Mon	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**	**Sun**
Rope skipping	___	___	___	___	___	___	___
Rowing (machine or boat)	___	___	___	___	___	___	___
Skating (Ice or Roller)	___	___	___	___	___	___	___
Stair Climbing (continuous)	___	___	___	___	___	___	___
Stretching Exercise	___	___	___	___	___	___	___
Swimming (gentle)	___	___	___	___	___	___	___
Swimming (non-stop)	___	___	___	___	___	___	___
Table Tennis (ping pong)	___	___	___	___	___	___	___
Tai Chi	___	___	___	___	___	___	___
Tennis	___	___	___	___	___	___	___
Walking (slow strolling)	___	___	___	___	___	___	___
Walking (warmth inducing)	___	___	___	___	___	___	___
Walking (race or speed)	___	___	___	___	___	___	___
Other _____	___	___	___	___	___	___	___
Other _____	___	___	___	___	___	___	___
Other _____	___	___	___	___	___	___	___

Question 24:

How sure are you that you will do physical activity regularly during your leisure time in the coming year? **Circle one number** that comes closest to how you think.

Not at all sure — Very sure

0 ----------1 ----------2 ----------3 ---------- 4

Thank you very much for completing this survey!